A dissertation on

A STUDY OF MICRO ALBUMINURIA AS AN INDEPENDENT RISK FACTOR IN NON-DIABETIC ISCHEMIC STROKE

Submitted in partial fulfilment of award of the degree for

M.D. DEGREE IN GENERAL MEDICINE

BRANCH I

INSTITUTE OF INTERNAL MEDICINE

MADRAS MEDICAL COLLEGE

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI 600003

MAY 2019

CERTIFICATE

This is to certify that this dissertation entitled "**A STUDY OF MICRO ALBUMINURIA AS AN INDEPENDENT RISK FACTOR IN NON-DIABETIC ISCHEMIC STROKE**" submitted by Dr.R.PRIYANKA appearing for M.D. Branch I - General Medicine Degree examination in MAY 2019 is a bonafide record of work done by her under my direct guidance and supervision in partial fulfilment of regulations of the Tamil Nadu Dr. M.G.R. Medical University, Chennai.

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DECLARATION

I solemnly declare that the dissertation titled "**A STUDY OF MICRO ALBUMINURIA AS AN INDEPENDENT RISK FACTOR IN NON-DIABETIC ISCHEMIC STROKE**" is done by me at Madras Medical College & Rajiv Gandhi Govt. General Hospital, Chennai during 2017 under the guidance and supervision of Prof DR. R.PENCHALAIAH, M.D. The dissertation is submitted to The Tamil Nadu Dr.M.G.R. Medical University towards the partial fulfilment of requirements for the award of M.D. Degree (Branch I) in General Medicine.

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Above all I thank my God Almighty for His immense blessings and guidance.

CONTENTS

ABBREVIATIONS

CBC	-	Complete blood count
CRP	-	C-reactive protein
CT	-	Computer tomography
CTA	-	CT angiography
DUS	-	Duplex ultrasound scan
DWI	-	Diffusion weighted imaging
FDA	-	Food and drug administration
ICA	-	Internal carotid artery
IMT	-	Intima media thickness
LACI	-	Lacunar infarct
MCA	-	Middle cerebral artery
MES	-	Microembolic signals
MR	-	Magnetic resonance
MRA	-	MR angiography
MRI	-	Magnetic resonance imaging
mRS	-	Modified Rankin Scale

NIHSS	-	National Institutes of Health Stroke Scale
NINDS	-	National Institutes of Neurological Disorders and Stroke
OCSP	-	Oxfordshire Community Stroke Project
PACI	-	Partial anterior circulation infarct
POCI	-	Posterior circulation infarct
SITS	-	MOST SITS-Monitoring Study
TACI	-	Total anterior circulation infarct
TCD	-	Transcranial Doppler T
CCD	-	Transcranial colour coded Doppler
TEE	-	Transoesophageal echocardiography
TIA	-	Transient ischemic attack
TOF	-	Time of flight
MRA	-	Magnetic resonance angiography
TOAST	-	Trial of Org 10172 in Acute Stroke Treatment
tPA	-	Tissue plasminogen activator

INTRODUCTION

AIMS AND OBJECTIVES

REVIEW OF LITERATURE

MATERIALS AND METHODS

RESULTS AND ANALYSIS

DISCUSSION

CONCLUSION

BIBLIOGRAPHY

ANNEXURE

INTRODUCTION

Stroke is defined as rapidly developing clinical signs due to focal disturbance of cerebral function lasting for more than 24 hours or leading to death with no apparent cause other than vascular origin.

Cerebrovascular disease is the leading cause of death throughout the world. Stroke is classified into two main types – ischemic and hemorrhagic stroke. Ischemic stroke accounts for about 63% of all cases and is due to the obstruction of the blood vessel by a thrombus or emboli.

Modifiable Risk Factors

Diabetes

Hypertension

Atrial fibrillation

Smoking etc.,

The realisation that atherosclerosis thus stroke is an inflammatory disease has led to the search of new risk factors. The markers of inflammation like CRP, ICAM-1, phospholipase a2, wbc count, interleukins, e nos, homocysteine, RAS, fibrinogen, Lp a, TGF, infectious agents like Chlamydia, CMV, H pylori have been proposed as new risk factors for stroke. One more addition to the list is micro albuminuria.

Micro albuminuria is defined as urinary excretion of albumin 20-200mcg/mg creatinine in early morning urine sample.

Micro albuminuria is a strong marker of endothelial damage, is proven to have an association with ischemic stroke.

Thus estimating micro albuminuria by simple non-invasive dipstick procedure will be new addition to the long list of risk factors of stroke and by treating it incidence of stroke might be decreased.

AIM AND OBJECTIVES

To determine the presence of micro albuminuria in non-diabetic ischemic stroke patients and proving micro albuminuria as an independent risk factor.

REVIEW ON LITERATURE

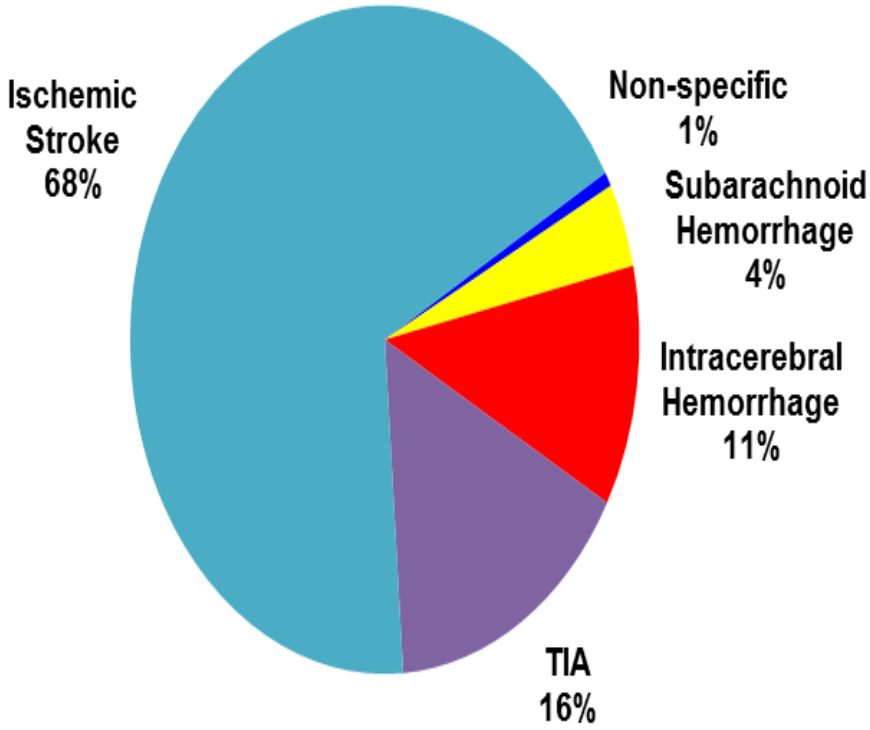
Cerebrovascular accident is the second leading cause of death worldwide. The incidence of cerebrovascular accident increases with age ,and the number of stroke is projected to increase as the elderly population grows.

There are two main type of stroke :

1. Hemorrhagic stroke
2. Ischemic stroke

Ischemic stroke is the major type of stroke constitutes 50- 75%. Ischemic stroke is occlusion of blood vessels by thrombi or emboli.

Hemorrhagic stroke is due to rupture of blood vessels



Types	Percentage
Cerebral infarction	
Large vessel occlusion	50
Small vessel (lacunar) infarcts	25
Cardiac emboli	15
Blood disorders	5
Vasculitis	5
Primary ICH	
Hypertensive bleeds	60
Amyloid angiopathy	20
Vascular malformations	15
Bleeding diathesis	5
Non traumatic SAH	
Aneurysms	80
Vascular malformations	10
Non aneurysmal SAH	10

DEFNITIONS

Stroke is defined as an abrupt onset of neurological deficit that is attributable to a focal vascular cause.

TRANSIENT ISCHEMIC ATTACKS

TIA is defined when all neurological signs and symptoms resolve within 24 hours without evidence of brain infarction on brain imaging.

STROKE

Stroke has occurred if neurological signs and symptoms last for more than 24 hours or brain infarction is demonstrated.

STROKE IN EVOLUTION

Stroke in Evolution is a progressive neurological deficit developing over few hours or days, which evolves to Completed stroke after a few hours or days.

COMPLETED STROKE

Completed Stroke is a stroke syndrome in which the deficit is prolonged and often permanent causing demonstrable parenchymal damage and does not progress beyond 96 hrs

REVERSIBLE ISCHEMIC NEUROLOGICAL DEFICIT

Neurological deficit resolves within 1-3 weeks

EPIDEMIOLOGY

Stroke is one of the leading cause of morbidity in adults worldwide.

The morbidity and mortality associated with stroke are

a) Global. 400-800 strokes per 1oo,ooo

b) 5.7 million deaths

c) 16 million new acute stroke every year

d) Disability adjusted life year (DALYS) around 28 lakhs

e) 4 week case fatality rate ranges from 18% - 36%

INDIA

a) Prevalence 90- 222 per 100,000

b) 102,620 million deaths.

c) In each year the incidence of strokes cases were 1.4 to 1.6 million

d) 6,398,000 DALYs

e) The incidence of stroke below 40 years were around 12%.

f) 4 week case fatality rate ranges from 17%- 36%

PATHOPHYSIOLOGY OF ISCHEMIC STROKE

Arterial occlusion of an intracranial vessel causes reduction in blood flow to the brain. The magnitude of flow reduction depends on

a- Collateral blood flow

b- Site of occlusion

c- Systemic blood pressure

Blood flow	Time	Results
0	4-10mins	Brain death
<16-18/min	1 hour	Infarction
<20ml/min	Several hours or days	Ischemia

Cerebral infarction occurs via two pathways

1. Necrotic pathway

    - Ischemia – decreased glucose and oxygen to neurons – failure of mitochondria to produce ATP- membrane ion pumps stop functioning – calcium influx – proteolysis – cell death
    - Arterial occlusion – increased extracellular glutamate - Neurotoxicity
    - Mitochondrial dysfunction also releases free radicals – destruction of neurons

2. Apoptotic pathway :

Lesser degrees of ischemia favour apoptotic pathway where cells die

days to weeks later

Fever and hyper glycemia are important risk factors for stroke, so must be avoided

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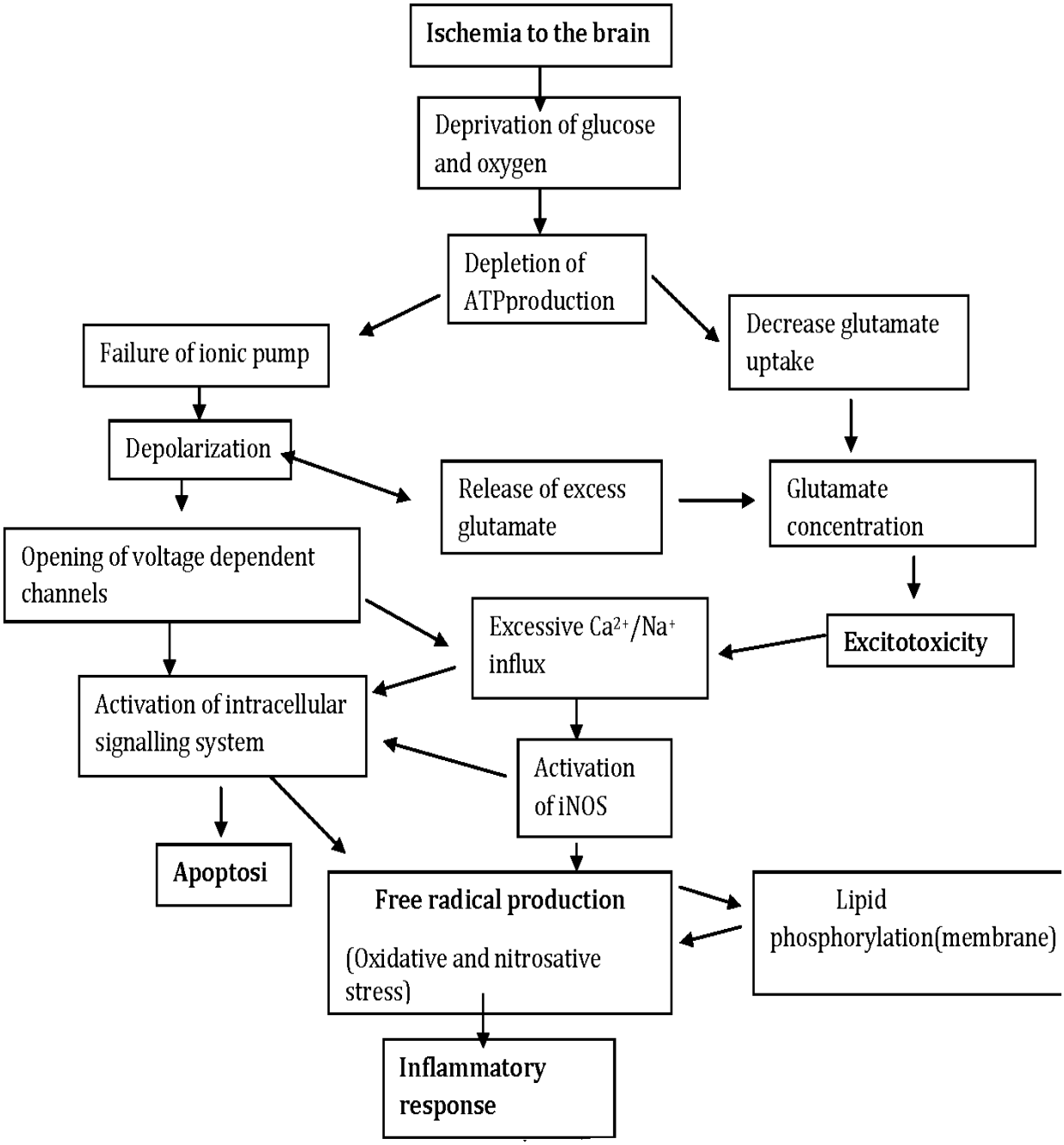

Ischemia to the brain
Deprivation of glucose and oxygen
Depletion of ATPproduction
Failure of ionic pump
Decrease glutamate uptake
Depolarization
Release of excess glutamate
Glutamate concentration
Opening of voltage dependent channels
Excessive Ca2+/Na+ influx
Excitotoxicity
Activation of intracellular signalling system
Activation of iNOS
Apoptosi
Free radical production
(Oxidative and nitrosative stress)
Lipid phosphorylation(membrane)
Inflammatory response

CLASSIFICATION

1. Oxfordshire classification
   - Anterior circulation syndrome (total)

     Anterior and Middle cerebral artery
   - Anterior circulation syndrome (partial)
   - Lacunar syndrome (small vessel)
   - Posterior circulation syndrome

2. Hachinske and Norris classification

A. Presumed stroke

Presumed TIA

B. Anatomic classification

a. By vascular supply - Carotid

Vertebro basilar

b. By location

Supra tentorial — Lobar

Ganglionic/thalamic

Infra tentorial — Cerebellar

Brainstem

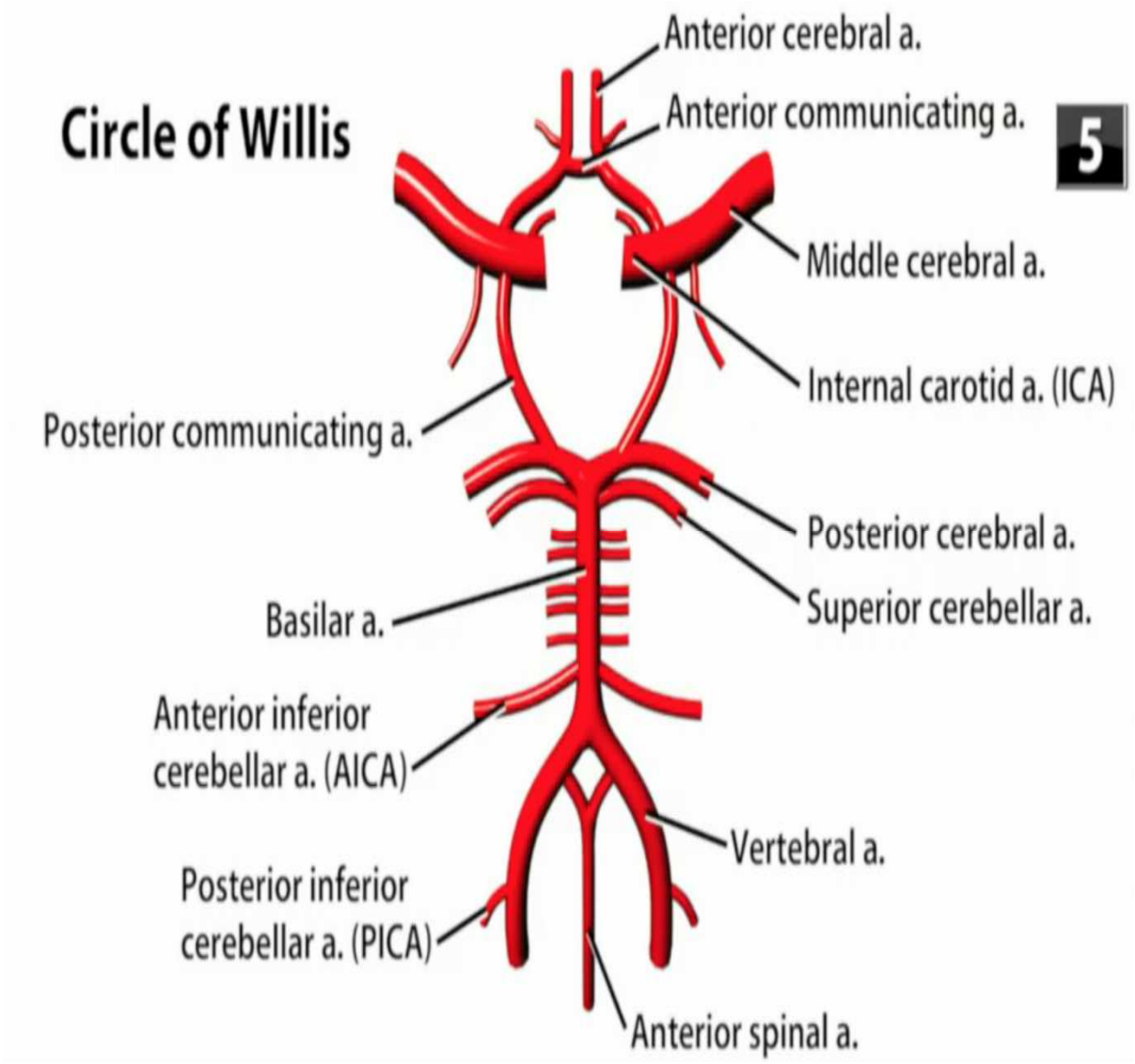
C. Etiological classification

a. By result

Cerebral infarct	-	Arterial
		Arteriolar
		Venous
Cerebral haemorrhage		Parenchymal
		Subarachnoid

b. By cause

Ischaemia	Embolism
	Extracranial
Haemorrhage	Hypertension
	Amyloid angiopathy
	Vascular malformation
	Aneurysm


Circle of Willis
5
Anterior cerebral a.
Anterior communicating a.
Middle cerebral a.
Internal carotid a. (ICA)
Posterior communicating a.
Posterior cerebral a.
Superior cerebellar a.
Basilar a.
Anterior inferior cerebellar a. (AICA)
Vertebral a.
Posterior inferior cerebellar a. (PICA)
Anterior spinal a.

ETIOLOGY OF ISCHEMIC STROKE

COMMON	UNCOMMON
Thrombosis	Protein C, protein S deficiency
Lacunar stroke	Factor V leiden mutation
Large Vessel thrombosis	Anti thrombin deficiency
Dehydration	APLA, SLE
Embolic occlusion	Malignancies
Arterial dissection	Sickle cell anemia, Beta thalassemia
Cardio embolic	Polycythemia vera
Atrial fibrillation	Homocysteinemia
Dilated cardiomyopathy	TTP
MI	OCPs
Mitral stenosis	Nephrotic syndrome
Infective endocarditis	DIC
	Venous sinus thrombosis
	Fibro muscular dysplasia
	Vasculitis
	Atrial myxomas
	Drugs – cocaine, amphetamine
	Moya moya disease
	Eclampsia

RISK FACTORS

- ✓ Old age
- ✓ Male gender
- ✓ Hypertension
- ✓ Smoking
- ✓ Increase Lipoprotein a
- ✓ Diabetes
- ✓ Hypercoagulable states
- ✓ Atrial fibrillation
- ✓ Alcohol
- ✓ Increased salt intake
- ✓ Vascular diseases – CAD,PVD
- ✓ Hereditary syndromes – Marfan, Ehler Danlos, Fibro muscular dysplasia
- ✓ Pseudo xantoma elasticum, Sickle cell disease, Fabry disease

CLINICAL FEATURES

In transient ischemic attack, symptoms of stroke are resolved within 24 hours.

ABCD2 score is useful in predicting the short-term stroke risk after a TIA

A = Age

B = Blood pressure

C = Clinical symptoms

D = Duration of symptoms

D = Diabetes.

Age >60 -Yes +1

BP > 140/90 mmHg at initial evaluation -Yes +1

Clinical features of TIA:

Unilateral weakness +2

Speech disturbance without weakness +1

Duration of symptoms

10-59mins +1

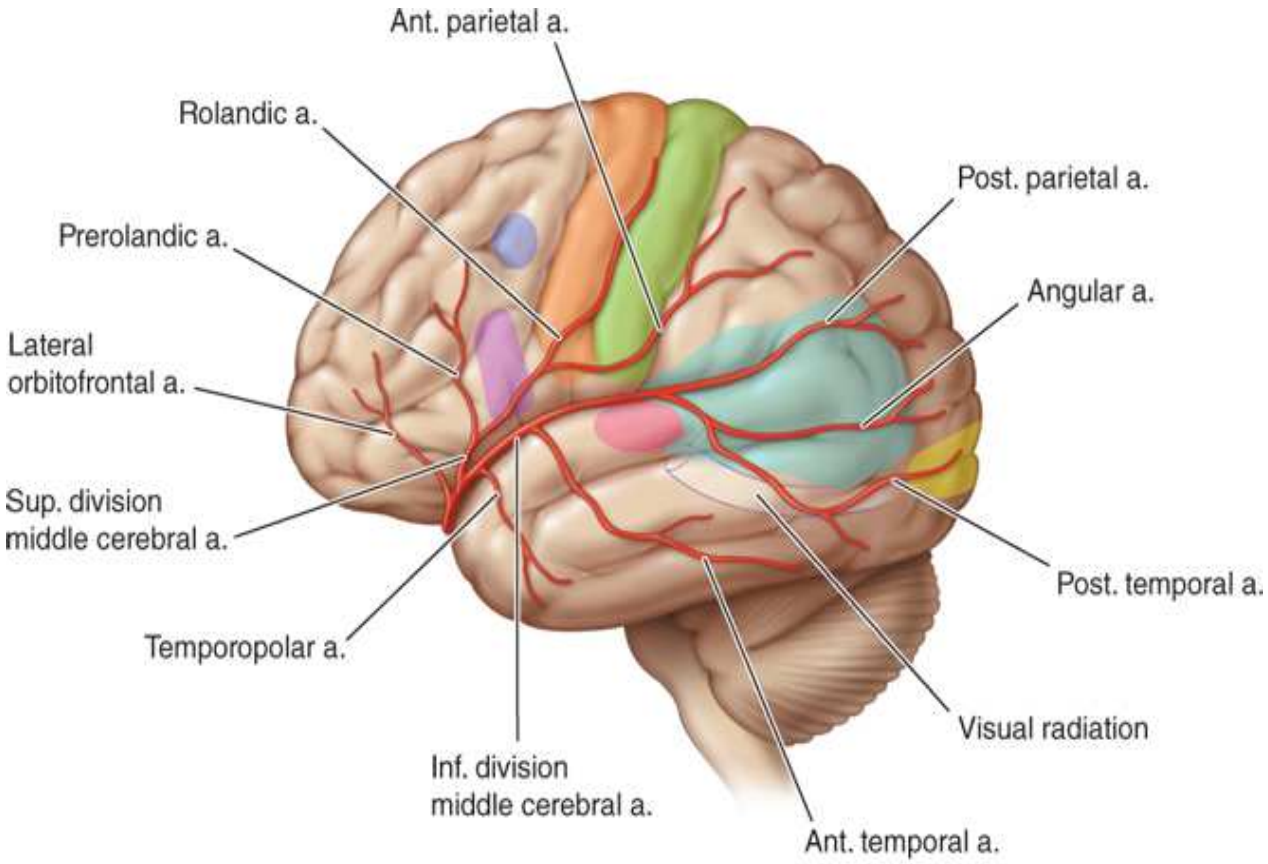
Over 60 mins +2

Diabetes mellitus in patient's history?- Yes +1

HIGH RISK – score of 4 or above. Within 24 hrs consult TIA clinic

LOW RISK – any score of 3 or under 3. Within 7 days consult TIA clinic

MCA TERITORY



KEY

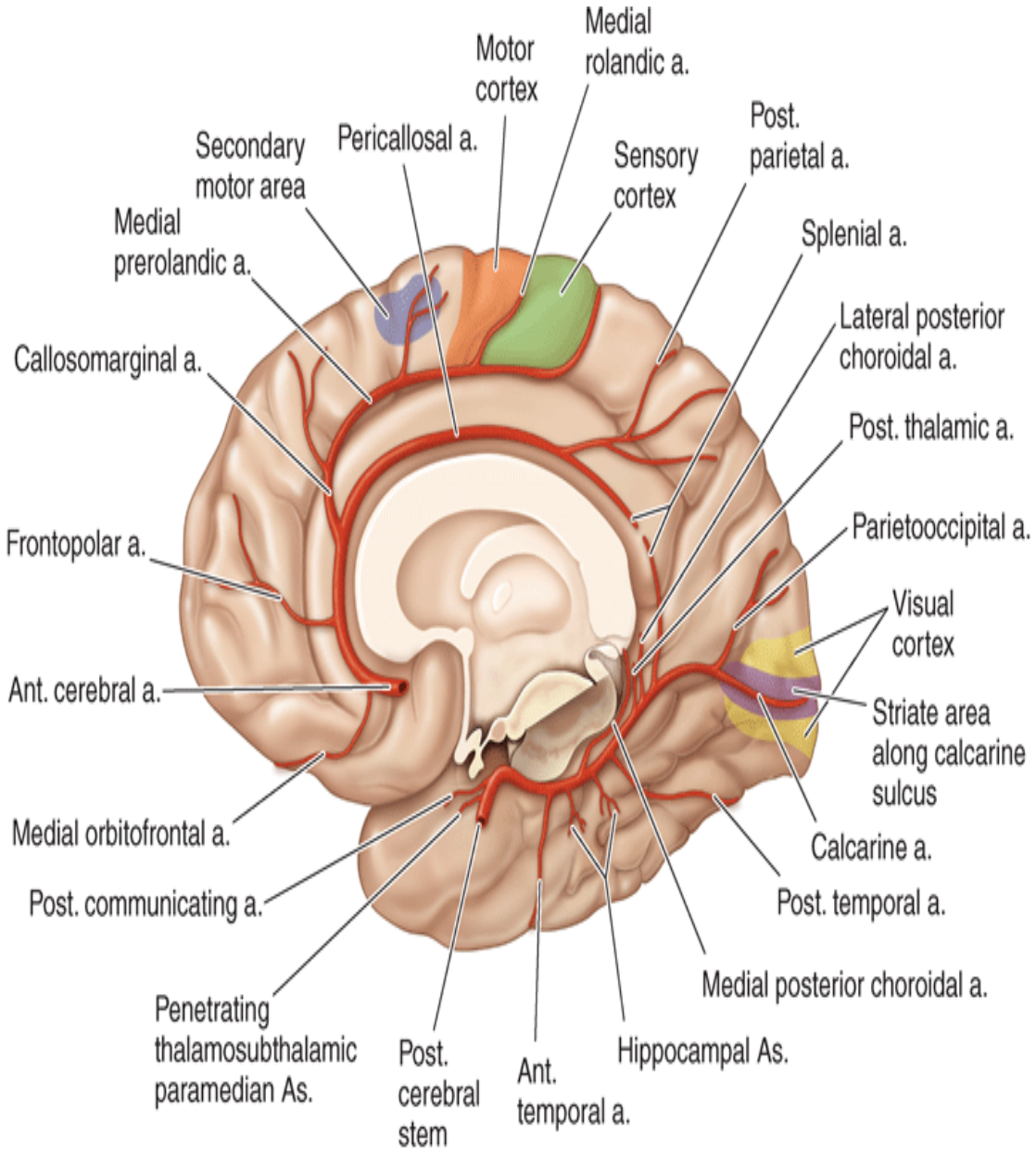
Broca's area | Sensory cortex | Auditory area | Motor cortex

Contraversive eye center | Wernicke's aphasia area | Visual cortex

MIDDLE CEREBRAL ARTERY INFARCT

1) Paralysis of contra lateral face ,arm ,leg and sensory impairment over same area- Somatic motor and sensory area
2) Motor aphasia - Motor area of dominant hemisphere
3) Acalculia, alexia, finger agnosia , right left confusion (gestermann syndrome) –Dominant parieto occipital lobe
4) Apraxia ,- non dominant parietal lobe
5) Homonymous hemi anopia - Optic radiation
6) Paralysis of conguate vision to opposite side – Frontal eye field

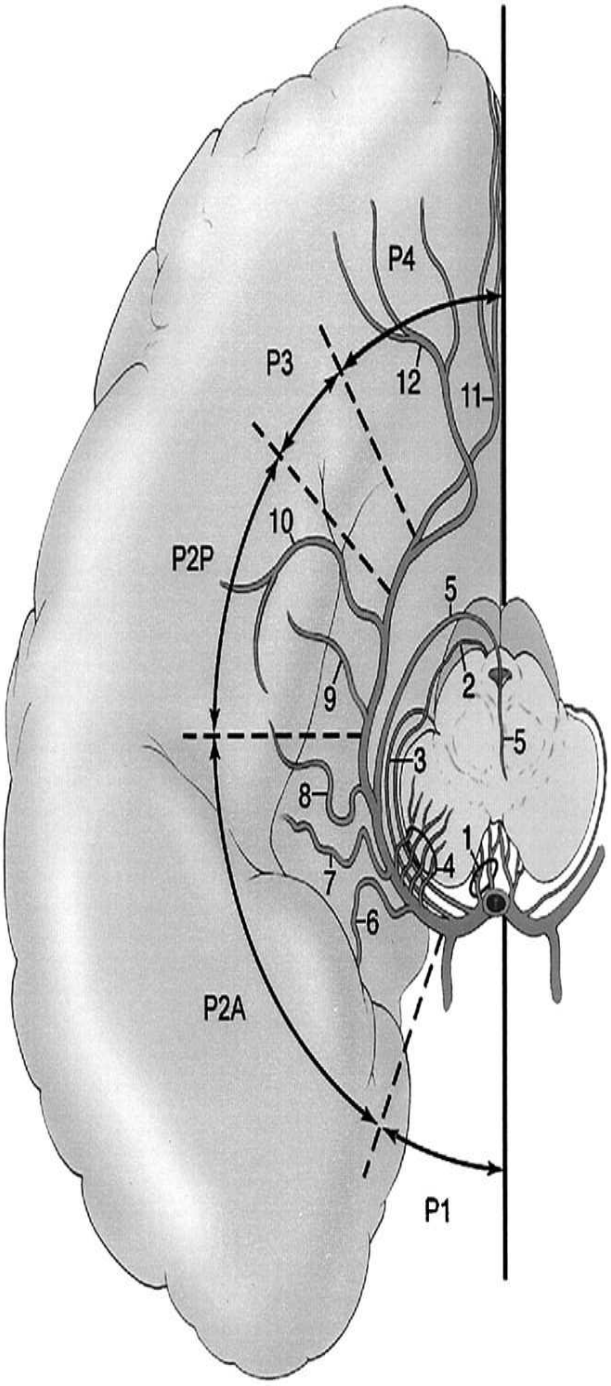
ACA TERRITORY



ANTERIOR CEREBRAL ARTERY INFARCT

a) Paralysis of opposite site toes ,foot, leg and sensory loss over same area Motor leg area and Sensory area respectively
b) Urinary incontinence – Para central lobule
c) C/l grasp ,sucking, gegenhalten reflex –Medial surface of posterior frontal lobe
d) Gait apraxia – Frontal cortex

PCA TERRITORY



P1 segment

1. Thalamo-perforating arteries
2. Long circumflex artery
3. Short circumflex artery

P2A segment

4. Direct peduncular perforating arteries
5. Medial posterior choroidal artery
6. Hippocampal artery
7. Anterior temporal artery
8. Middle temporal artery

P2P segment

9. Posterior temporal artery
10. Lateral posterior choroidal artery

P3 and P4 segment

11. Calcarine artery
12. Parieto-occipital artery

POSTERIOR CEREBRAL ARTERY

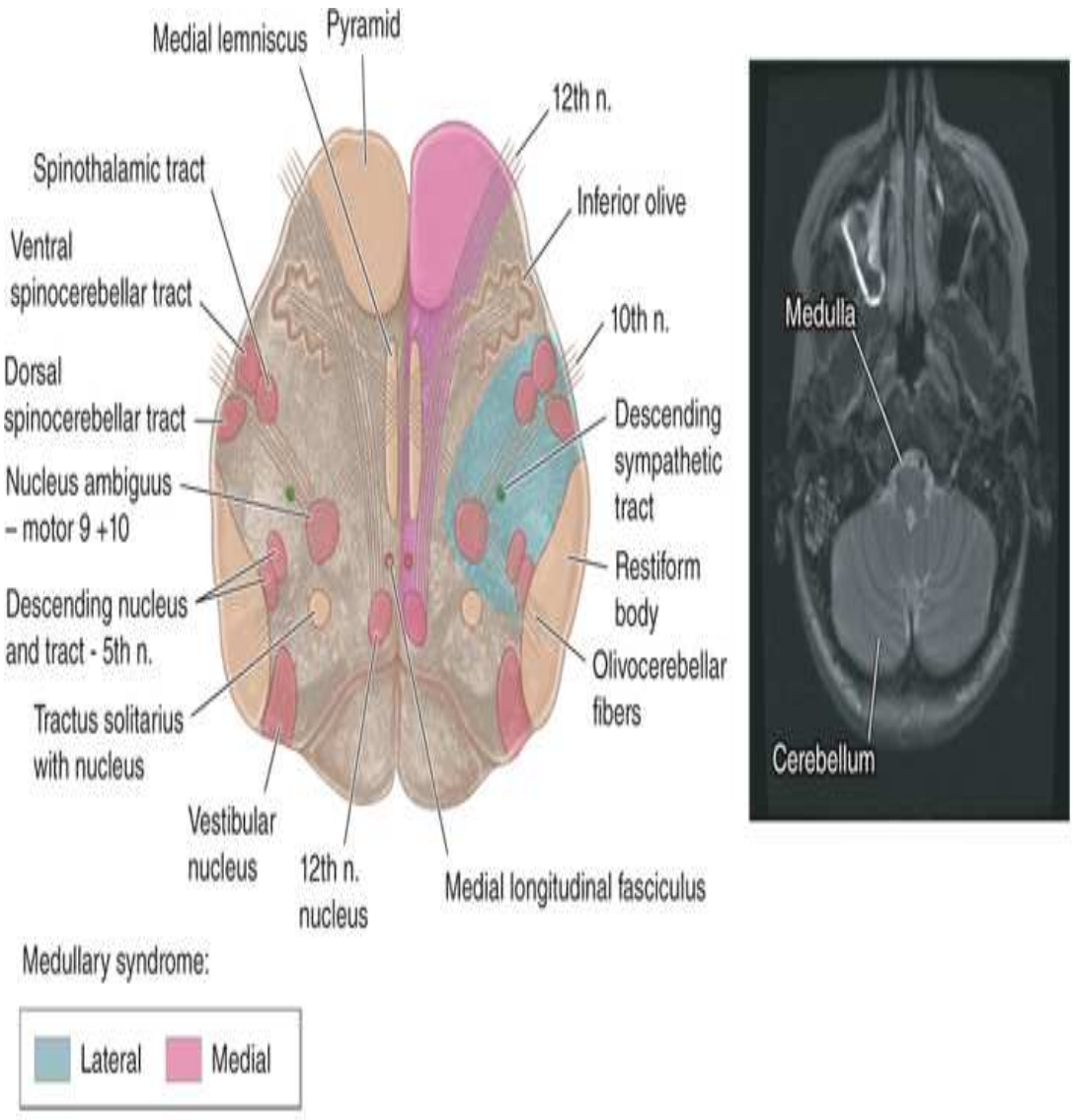
P1 SYNDROMES

SYNDROMES	CLINICAL FEATURES	STRUCTURES INVOLVED
Claude	Cerebellar ataxia-crossed and I/L third nerve palsy	Red nucleus or Dentate rubro thalamic tract
Weber	C/L hemiplegia, I/L third nerve palsy	Cerebral peduncle
Benedict	C/L rubral tremor + C/L Hemiplegia+ III nerve palsy	Red nucleus with cerebral peduncle
Dejerine Roussy Syndrome	C/L hemi sensory loss	Thalamus
Sub thalamus	C/L hemi ballismus	

P2 SYNDROMES

SYNDROMES	CLINICAL FEATURES	STRUCTURES INVOLVED
Antons syndrome	Cortical blindness	B/L occipital lobe
Balints syndrome	Asimultagnosia and Palinopsia	B/L visual association area
Occipital lobe	C/L homonymous hemianopia with macular sparing	
Medial temporal lobe	Memory impairment	
	Visual hallucination	

AXIAL SECTION AT THE LEVEL OF MEDULLA



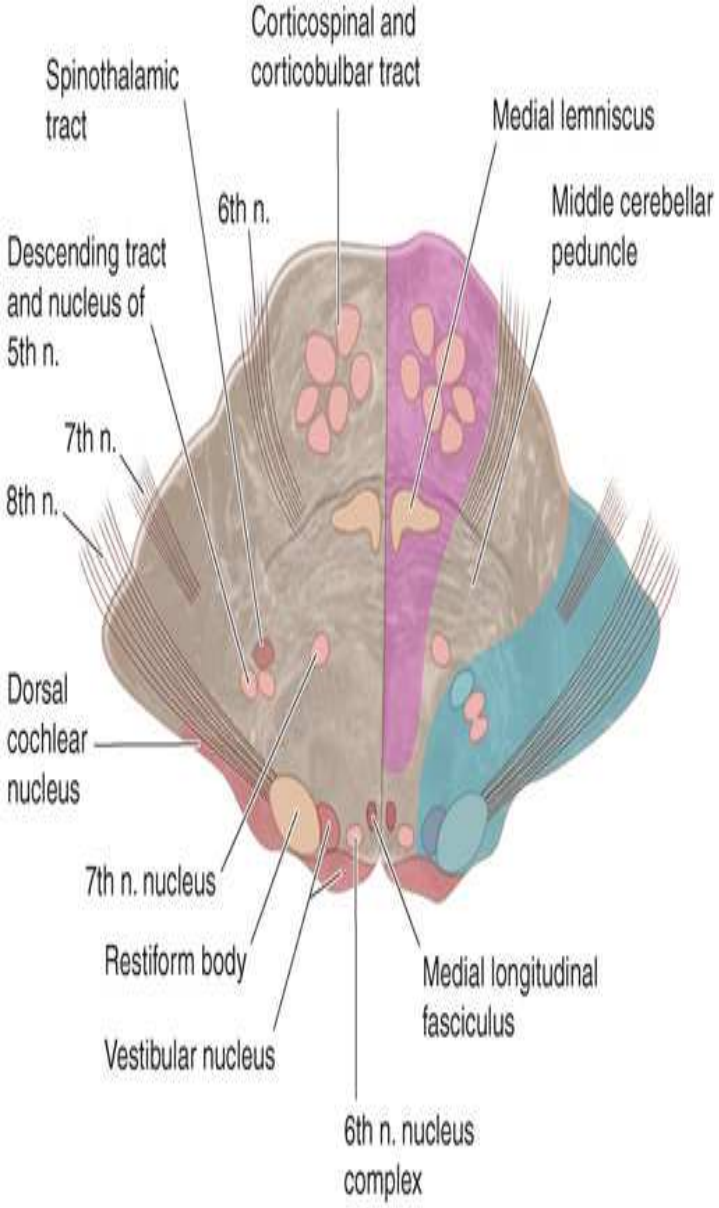
MEDIAL MEDULLARY SYNDROME

1. On the side of lesion - Paralysis with atrophy of one half of the tongue – I/L XII nerve
2. On the opposite side – Paralysis of arm and leg sparing face, impaired tactile and proprioceptive sense – C/L pyramidal tract and medial leminiscus

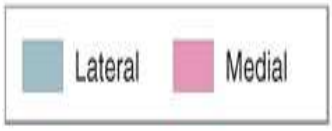
LATERAL MEDULLARY SYNDROME

1. On the side of lesion –
   A) Pain, numbness and impaired sensation over one half of the face – Descending tract of V nerve.
   B) Nystagmus , vertigo – Vestibular nucleus
   C) Dysphagia, hoarseness, paralysis of palate and vocal cord – IX and X Nerves
   D) Loss of taste – NTS
   E) Ataxia –Cerebellar hemisphere
   F) Weakness of lower face – UMN facial palsy
   G) I/L numbness of arm, tongue or leg – Cuneate and gracile nucleus
2. On the opposite side of lesion – impaired pain and temperature – Spino thalamic tract.

AXIAL SECTION AT INFERIOR PONS



Inferior pontine syndrome:



Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine, 18th Edition*: www.accessmedicine.com

MEDIAL INFERIOR PONTINE SYNDROME

On side of lesion –

A) Paralysis of conjugate gaze – centre for conjugate gaze

B) Nystagmus – vestibular nucleus

C) Ataxia – middle cerebellar peduncle

D) Diplopia on lateral gaze

On opposite side of lesion –

A) Paralysis of face, arm and leg – Corticobulbar and corticospinal tract

B) Impaired touch and proprioception – Medial lemniscus

LATERAL INFERIOR PONTINE SYNDROME – AICA

On the side of the lesion –

A) Nystagmus , vertigo – Vestibular nerve

B)Facial paralysis – VII nerve

C)Paralysis of conjugate gaze – Centre for conjugate gaze

D)Deafness and tinnitus – Auditory or cochlearnucle

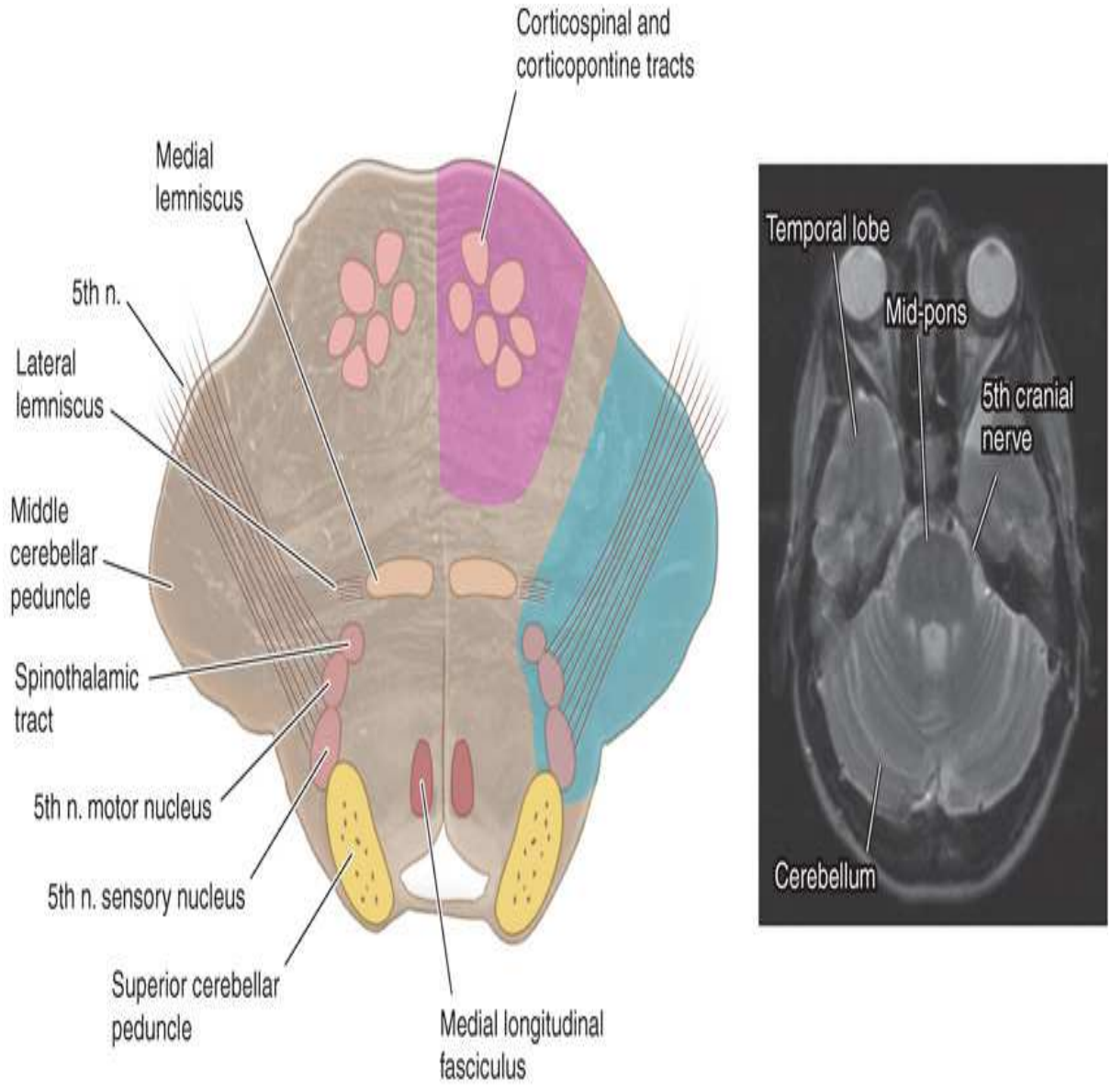
E)Ataxia- Middle cerebellar peduncle

F) Impaired sensation over face – V nerve

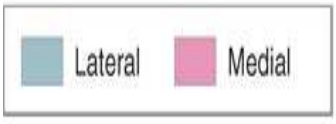
On opposite side –

Impaired pain and temperature – Spino thalamic tract.

AXIAL SECTION AT MID PONS



Midpontine syndrome:



Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine, 18th Edition*: www.accessmedicine.com

MEDIAL MIDPONTINE SYNDROMES

On the side of lesion – Ataxia of limbs - Pontine nuclei

On the opposite side –

A) Paralysis of face, arm and legs – Cortico bulbar and Cortico spinal

B) Impaired touch and proprioception – Medial Leminiscus

LATERAL MIDPONTINE SYNDROMES

On the side of lesion –

A) Ataxia – Middle Cerebellar peduncle

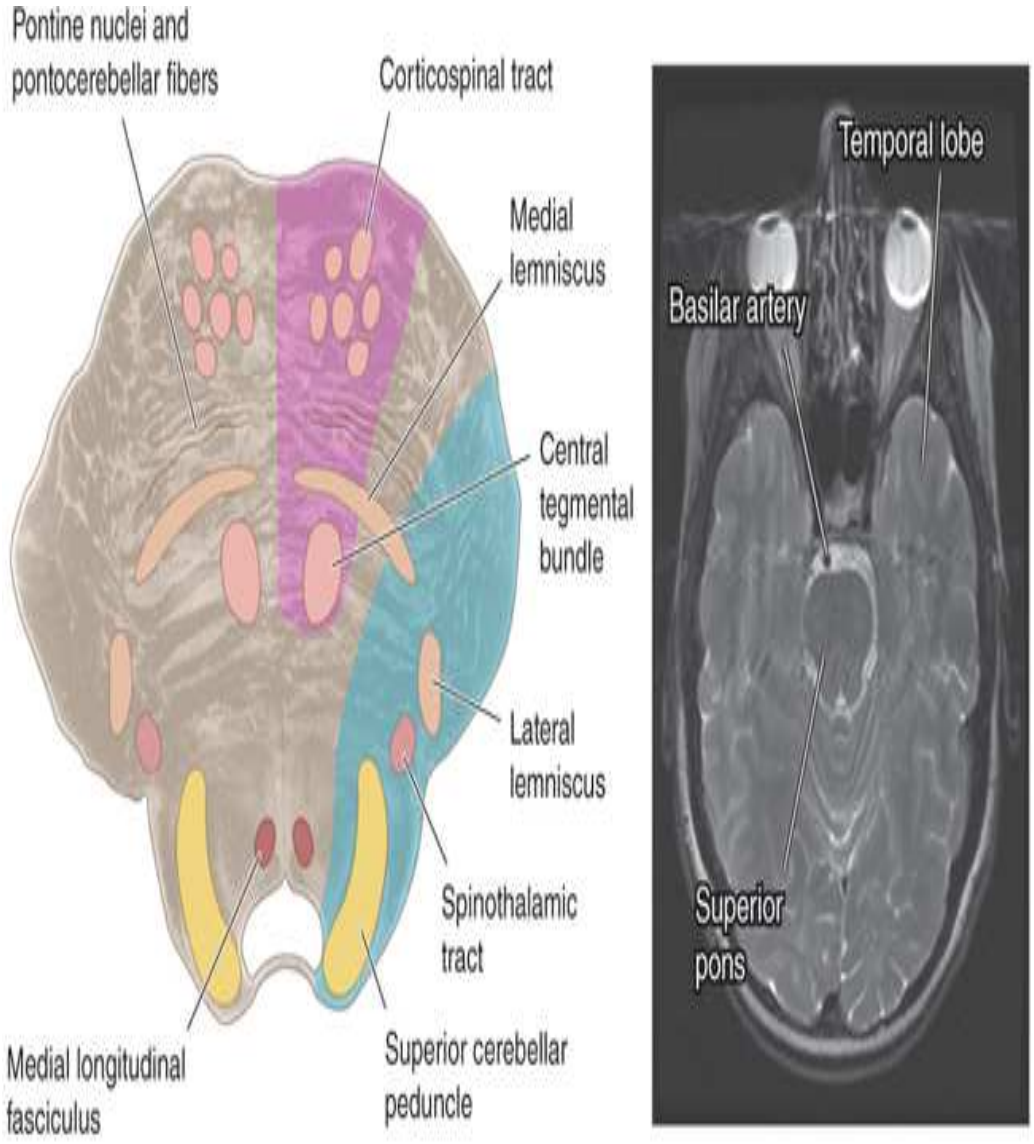
C) Paralysis of muscles of mastication – Motor fibres of V nerve

C) Impaired sensation over face – Sensory Fibres of V Nerve

Opposite side -

A) Impaired pain and temperature on limbs – Spino thalamic tract.

AXIAL SECTION AT SUPERIOR PONS



Superior pontine syndrome:

MEDIAL SUPERIOR PONTINE SYNDROME

On the side of the lesion –

A)Cerebellar ataxia – Superior and middle cerebellar peduncle

B) Internuclear ophthalmoplegia – Medial longitudinal fasciculus

C) Myoclonic syndrome

On opposite side of the lesion –

A) Paralysis of face, arm , leg- Cortico bulbar and Cortico spinal

B) Touch and proprioception impaired – Medial leminiscus

LATERAL SUPERIOR PONTINE SYNDROME

On the side of lesion –

A) Ataxia – Middle and superior cerebellar peduncles

B) Nystagmus and vertigo - Vestibular nucleus

C) Paralysis of conjugate gaze – Gaze centre

D) Skew deviation

E) Horner s syndrome – Descending sympathetic fibres

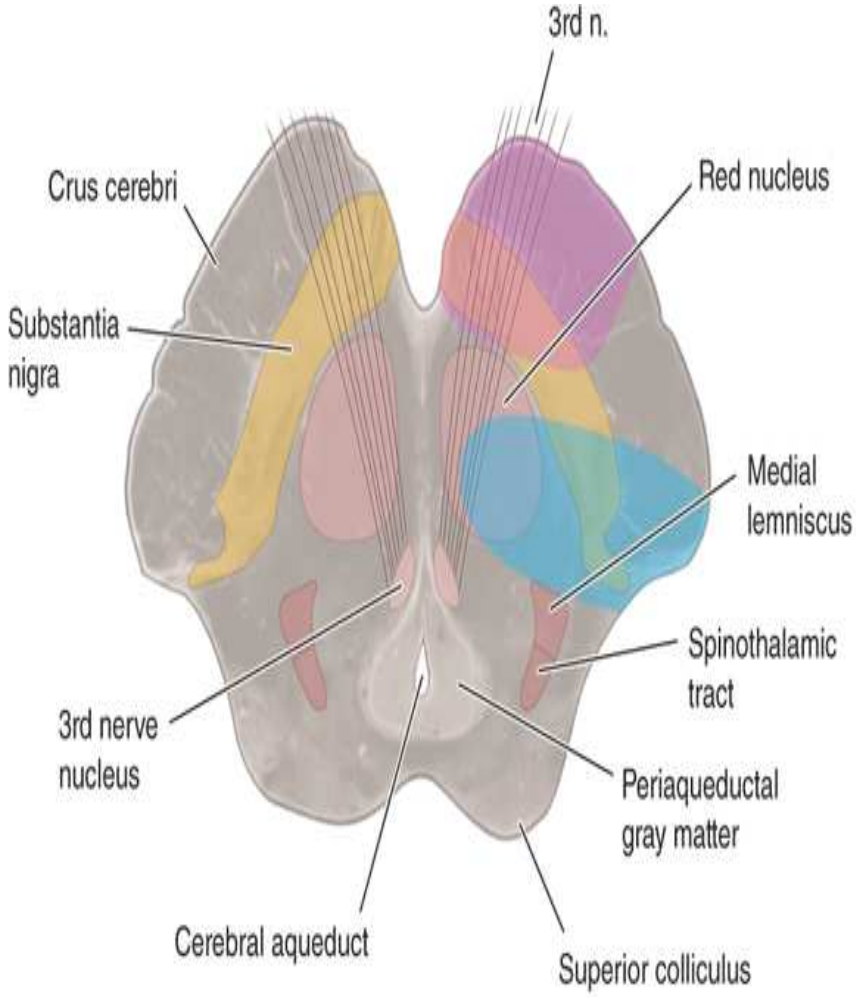
F) Tremor – Dentate nucleus

On the opposite side of lesion -

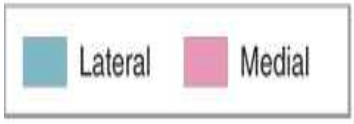
A) Impaired pain and temperature –Spino thalamic tract

B) Impaired touch and proprioception – Medial leminiscus

AXIAL SECTION AT MIDBRAIN LEVEL



Midbrain syndrome:



Source: J.L. Jameson, A.S. Fauci, D.L. Kasper, S.L. Hauser, D.L. Longo, J. Loscalzo: Harrison's Principles of Internal Medicine, 20th Edition

MEDIAL MIDBRAIN SYNDROME

On side of lesion – Eyes down and out – IV and VI nerves – Unopposed action

On opposite side – paralysis of face, arms and legs – Corticospinal and corticobulbar Tract

LATERAL MIDBRAIN SYNDROME

On side of lesion - Eyes down and out – IV and VI nerves – Unopposed action

On opposite side – hemiataxia, tremors – Red nucleus

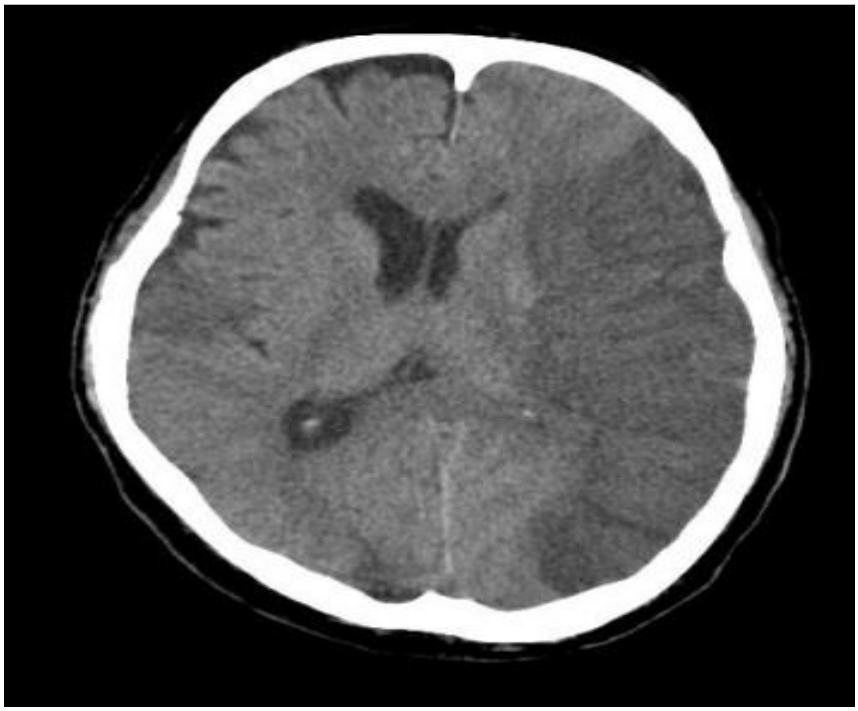
INVESTIGATIONS

1. CT scan – To differentiate between infarct and hemorrhage

To rule out other conditions mimicking stroke like neoplasm, abscess

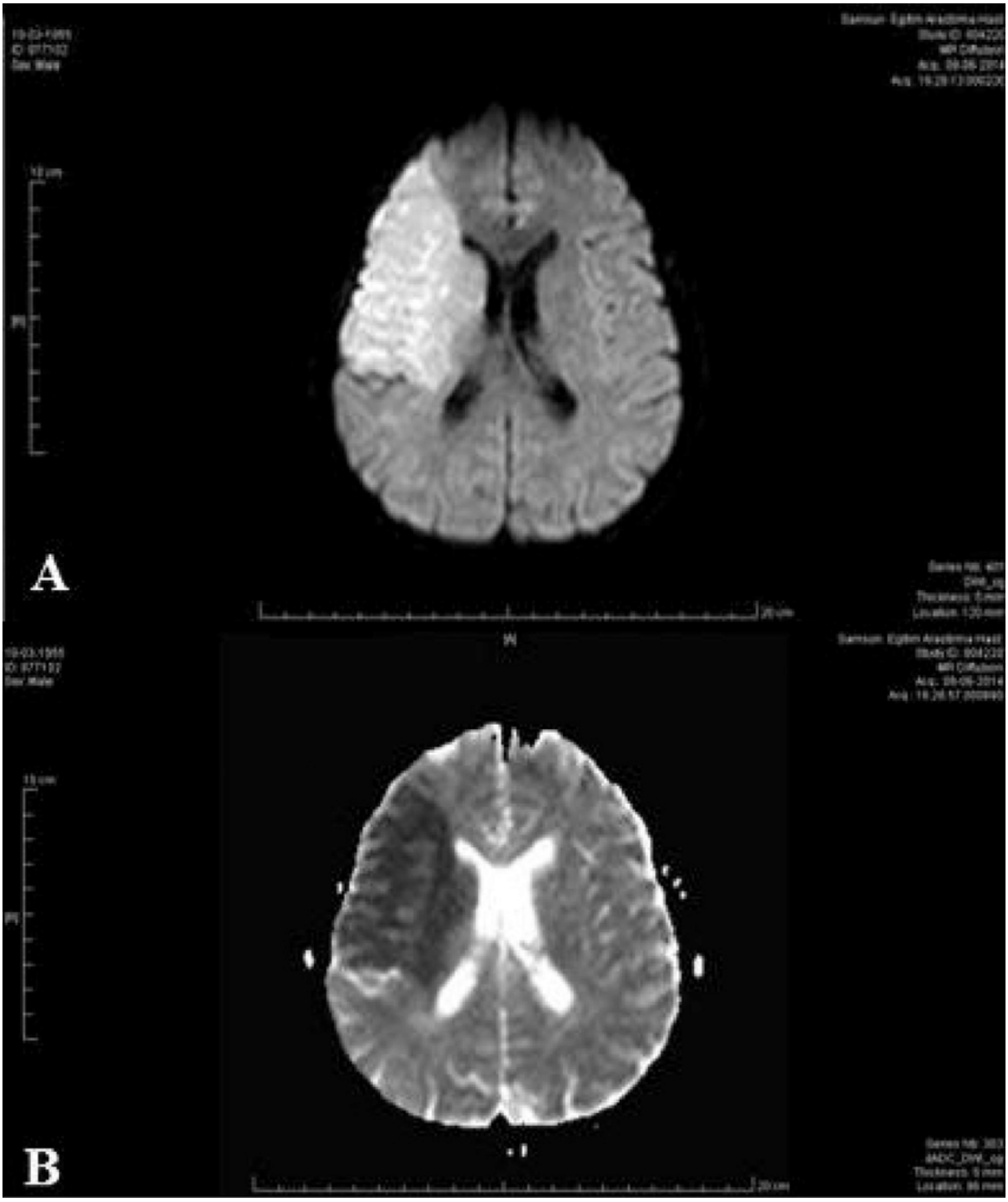
2. MRI scan – To know the size of infracted area
3. Diffusion weighted imaging - early diagnosis of infarct
4. MRI arteriography – confirmatory investigation for detecting stenosis, vasospasm, fibro muscular dysplasia, intramural thrombi and collaterals.
5. Carotid artery Doppler
6. MRI perfusion technique – can identify ischemic penumbra. Ischemic penumbra helps in selection of patients who may benefit from acute intervention like thrombolysis.

CT BRAIN showing INFARCT

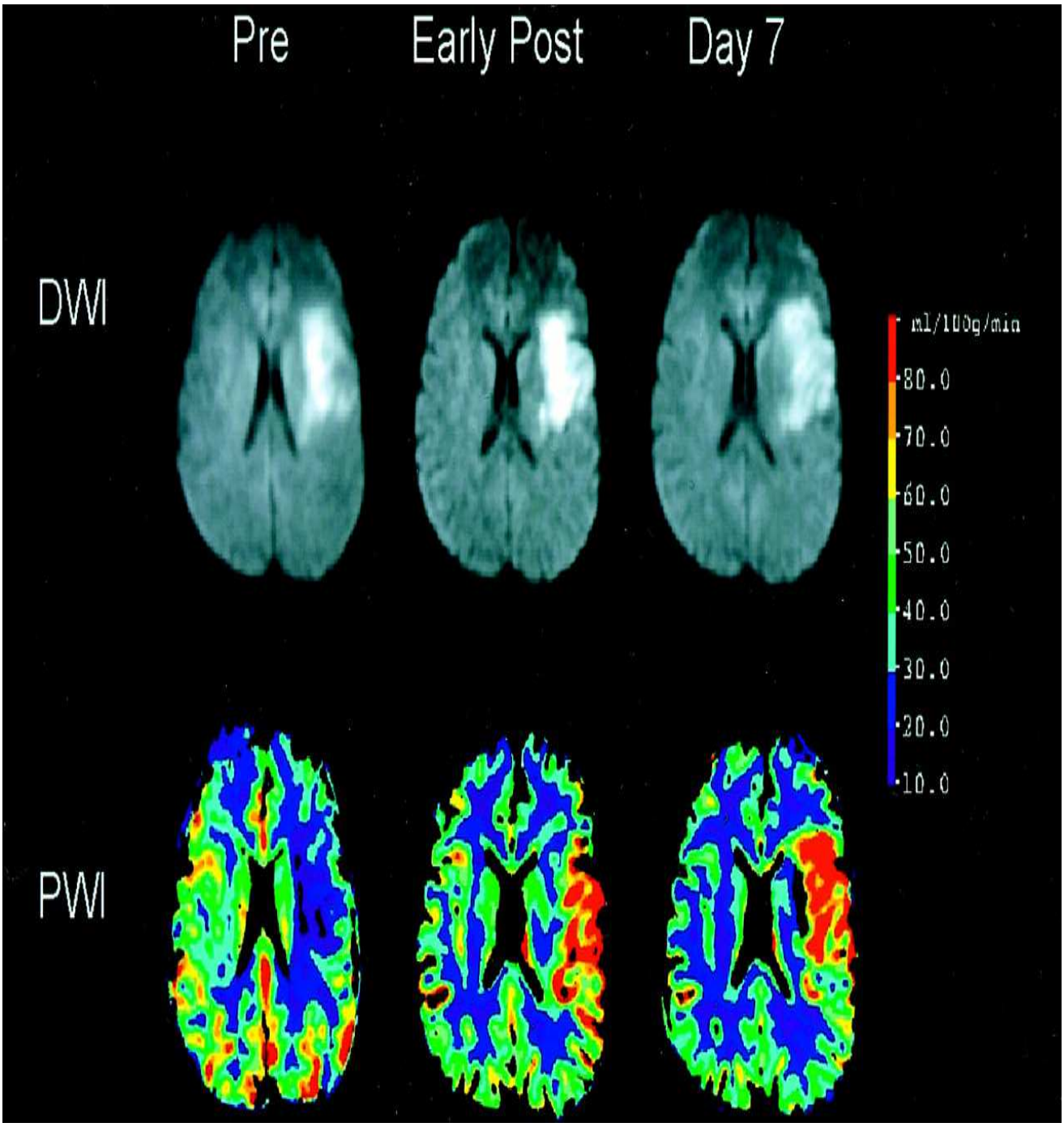


CT BRAIN showing HEMORRHAGE

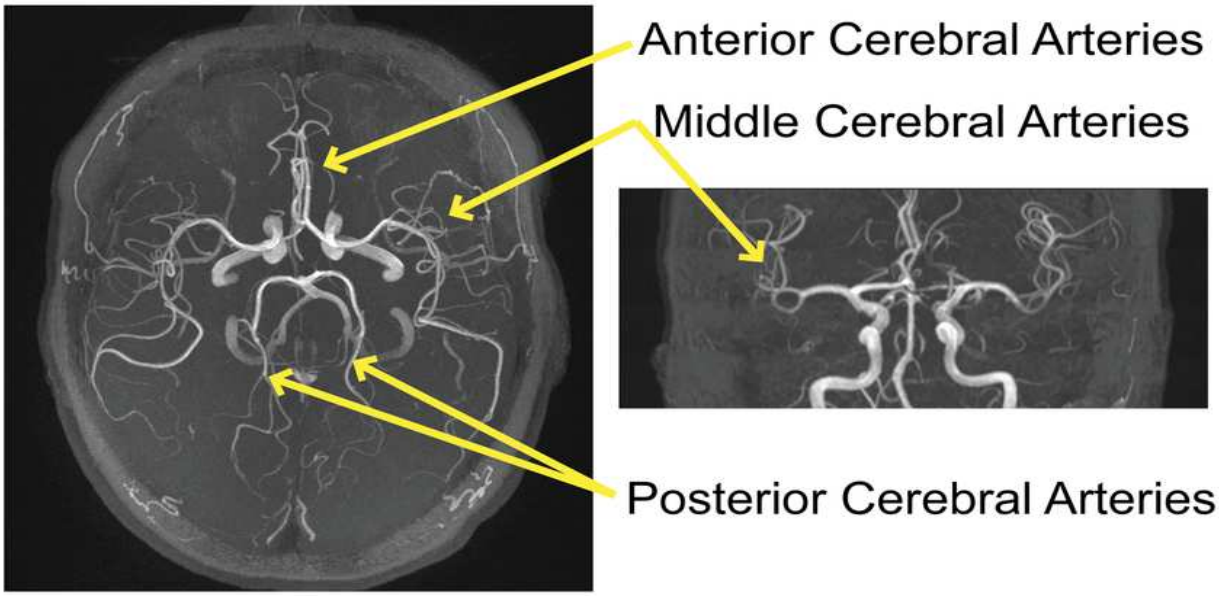
DIFFUSION WEIGHTED MRI SHOWING INFARCT



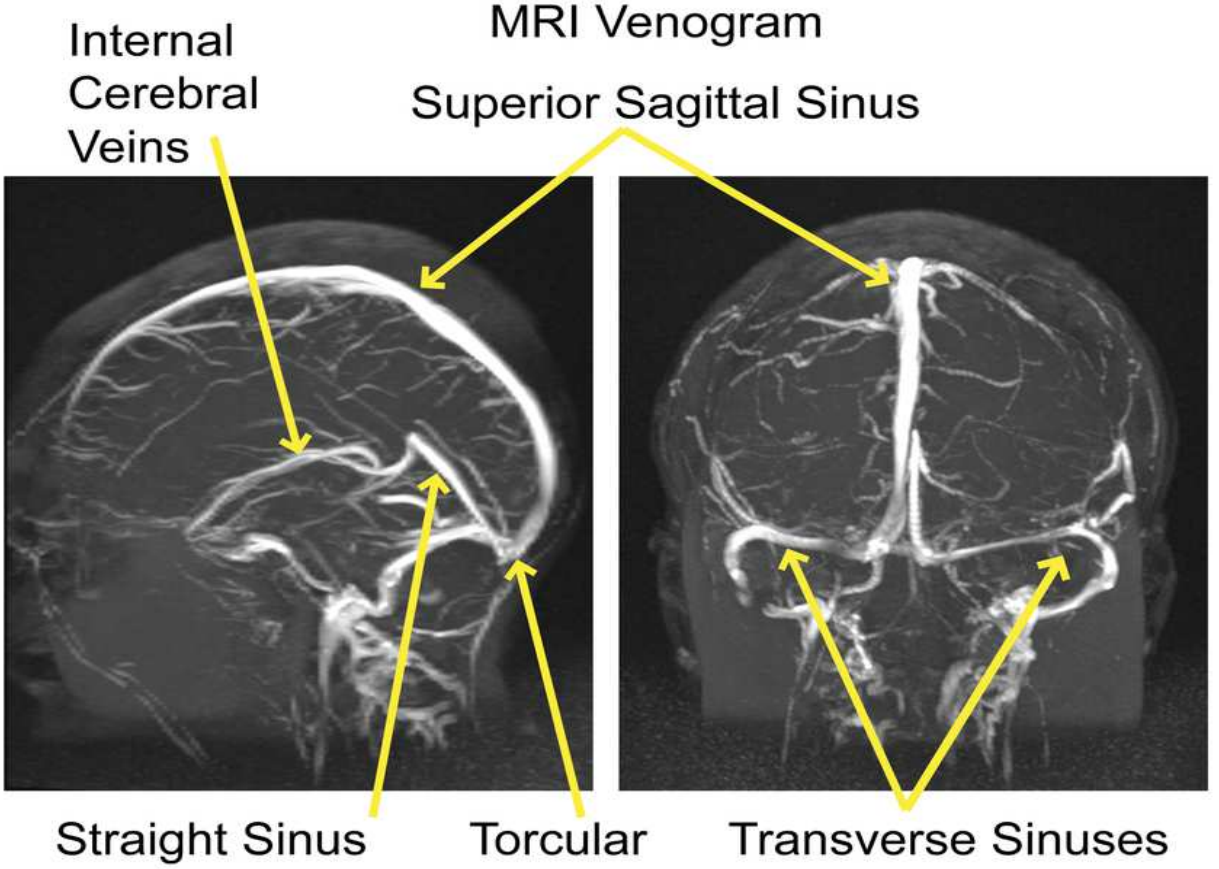
MRI PERFUSION SHOWING EFFECT OF THROMBOLYSIS



MRI Arteriogram



MRI Venogram



TREATMENT

1. Medical support

   - secure the airways to protect aspiration
   - To lower the blood pressure
   - To reduce brain edema
   - To prevent hyperthermia
   - To control blood sugars

2. Thrombolysis

INDICATION	CONTRAINDICATION
✓ Clinical diagnosis of stroke ✓ Onset of symptoms to the Time of drug administration within 3 hours ✓ CT scan showing no Hemorrhage or edema of >1/3 of MCA territory ✓ Consent by patient or surrogate	✓ Sustained BP 185/110 mm Hg despite treatment ✓ Platelet < 1,00,000 , HCT<25%, ✓ Blood glucose <50 or >400g/dl ✓ Use of heparin within 48 hours and ✓ Prolonged PTT and elevated INR ✓ Rapidly improving symptoms

	✓ Prior stroke or head injury within 3months, prior intracranial hemorrhage ✓ Patients undergone surgery within2 weeks ✓ Symptoms of mild stroke ✓ Any bleeding from GIT within 2 weeks deeply ✓ Comatose and stuporous ✓ Patients suffered from recent myocardial infarction.

IV rtPA 0.9mg/kg 10% given as bolus and remaining within 1hour

3. Antiplatelets – Aspirin or clopilet or combination of aspirin and dipyridamole
4. Anticoagulation – Indicated in conditions like carotid artery dissection, basilar artery thrombosis , cardio embolic stroke.
5. Neuro protection
6. Stroke centres and rehabilitation

THE PROGNOSIS OF ACUTE STROKE

The outcome of patients recovered from stroke depends on certain factors

1. **Age** :

Survival is better in younger than the older people,

Better in men than in women

2.Comorbid conditions:

Leads to recurrent stroke and also influence on outcome and survival of the individual

A. Diabetes,
B. Dyslipidemia,
C. Hypertension,
D. Atrial fibrillation,
E. Smoking, alcohol,
F. Previous h/o stroke

Diseases such as

A. COPD,
B. Parkinsons disease,
C. Peripheral vascular disease,
D. Polyneuropathy

have effect on functional recovery.

3. Lesion related factors

Survival is poor in anterior circulation infarcts than ICH or SAH

High risk of mortality

A. Coma at onset of stroke

B. Seizures

C. Brain stem dysfunction

D. B/L pyramidal signs

4. Specific therapy

Good cardiac and respiratory support may reduce the mortality.

5. Biochemical factors:

Factors associated with poor outcome are

A. Micro albuminuria

B. . Lipoprotein (a)

C. Higher blood glucose at the onset of stroke even in non diabetic individual

STROKE SCALES

Acute assessment stroke scales

1. Canadian neurological scale
2. European stroke scale
3. Glasgow coma scale
4. Hemispheric stroke scale
5. National institute of health stroke scale

Functional assessment scale

1. Modified Rankins scale
2. Barthel index
3. Glasgow outcome scale
4. Berg balance

NATIONAL INSTITUTES OF HEALTH STROKESCALE

LEVEL	SCORE
Stages of consciousness	
Conscious	0 point
Somnolent	1 point
Patient responds to deep painful stimuli	2 points
Deeply comatose	3 points
Orientatation	
Tells about his age and date	0 point
Able to answer one question perfectly	1 point
Not able to answer any question properly	2 points
Response to verbal	
Obeys 2 verbal speech	0 point
Obeys 1 verbal speech	1 point
Not obeying to any verbal speech	2 points
Movement of eyes	
Perfect movement of both the eyes	0 point
Moderate paresis to 1 one side	1 point
Severe gaze palsy to 1 side	2 points

Visual impairment

Normal vision	0 point
Homonymous hemianopia (moderate)	1 point
Homonymous hemianopia (total)	2 points
Total visual impairment	3 points

Motor function (face)

Normal face	0 point
Minimal one sided facial palsy	1 point
Moderate one sided facial palsy	2 points
Total facial palsy either 1 or 2 sides	3 points

Motor function of the upper limb (scores 8 points)

No paralysis	0 point
Slight decrease in movement in upper limb	1 point
Minimal strength against gravity	2 points
Moderate strength against gravity but moves limbs	3 points
Complete paralysis	4 points

Motor function of the lower limbs (score 8 points)

No paralysis	0 point
Slight paralysis of lower limb	1 point
Moderate paralysis against gravity	2 points
Moderate strength against gravity but moves the limb	3 points
Complete paralysis	4 points

Ataxia of limb (not in presence of paralysis)

Normal ataxia	0 point
Present in 1 limb	1 point
Present in 2 limbs	2 points

Sensory modalities

Normal	0 point
Sensory loss from minimal to moderate	1 point
Sensory loss is complete	2 points

Speech

Speech is normal	0 point
Minimal to moderate speech impairment	1 point
Speech impairment is severe	2 points
Speech loss is complete	3 points

Articulation

Normal	0 point
Minimal to moderate articulation impairment	1 point
Severe articulation impairment	2 points

Neglect

Normal	0 point
Minimal to moderate visual or sensory neglect	1 point
Severe visual and sensory neglect	2 points

MODIFIED RANKINS SCALE

SCORE SEVERITY OF FUNCTIONAL LOSS

1- normal

2- symptoms present but no impairment

3- minimal impairment with no assistance required

4- impairment is moderate but can move

5- severe impairment

6- expired

COMPLICATIONS OF STROKE

Neurological

- o Recurrent stroke
- o Epileptic seizure

Infections

- o Urinary tract infection,
- o Chest infection
- o Others

Mobility related

- o Falls
- o Falls with serious injury
- o Pressure sores

Thromboembolism

- o Deep venous thrombosis
- o Pulmonary embolism

Pain

- o Shoulder pain
- o Other pain

Psychological

- o Depression
- o Anxiety
- o Emotionalism
- o Confusion

MICRO ALBUMINURIA

Micro albuminuria is defined as urine excretion of albumin of 20-200mcg/min or 30-300 mg/24 hrs

MECHANISM

Micro albuminuria is associated with vascular permeability. Any small changes in vessels gets amplified by kidney. Kidney receive quarter of cardiac output. The amount of albumin entering kidney is 70 kgs. The glomerular filtrate is 7g/24hrs. Most of the albumin is reabsorbed by proximal tubule leading to 10-30mg/24hrs of albumin in urine. The amount of albumin filtered over 24hrs is 7g. If 1% change in the systemic vascular permeability due to inflammation , extra 70mg of albumin will be filtered and albumin excretion will become more than 100mg per hour. Other mechanisms of micro albuminuria are

1. Impaired arterial dilatory capacity
2. Hyper homocysteinemia
3. Systemic trans vascular albumin leakage
4. Hyper insulinemia
5. Increased serum sialic acid
6. Elevated vwf concentrates and pro thrombotic factors

SIGNIFICANCE OF MICRO ALBUMINURIA

Micro albuminuria indicates increased vascular permeability and so its diagnosis shows not only renal disease but also higher risk of cerebrovascular diseases.

There are several studies that has been done and proved association of ischemic stroke and micro albuminuria

1. DAMSGAARD EM et al follow 216 patients selected as control subjects for diabetes during the screening for diabetes mellitus among patient aged between 60-75 years in Denmark between feb 1981 and 1987. Their examination showed median urinary excretion rate of albumin 8mcg/min. 8 of those below the median died whereas 23 above the median died and the **main cause of death was cardiovascular disease.**

2. YUDHKIN et al used Islington diabetes survey in 1988 and showed that there was **significant correlation between albumin excretion rate and BP, blood sugar but not with age, sex or BMI**.

3. MLCKB et al studied the frequency of micro albuminuria in patients with or without diabetes in Slovenia between 1994 and 1998. They showed **albuminuria was high in diabetes , hypertension, dyslipidemia and PVDs**.

4. HEIKKE MEIETTINEN et al during 1982 to 1990 showed that **increased excretion of urinary albumin in 25% non diabetes** and 58% diabetics.

5. A F Muhammed found that micro albuminuria was 3 times high in patients with acute ischemic CVA than healthy individuals. On follow up, healthy patients with **micro albuminuria had 32% increased risk of vascular events.**

6. YUYUN MF et al studied 23630 subjects between 40 to 79 years and followed them for 7 years. There were 246 strokes. He also found that in patients with **micro albuminuria , there was 50 % increased risk of stroke**. Thereby associating micro albuminuria independently with stroke.

7. HANS L HILLEGE et al studied micro albuminuria in Netherlands in 2001 and showed that **micro albuminuria is associated with cardiovascular risk factors.**

8. TURAJ et al studied 52 patients in Poland within 24 hours of stroke . Micro albuminuria was found in 24 out of 52 stroke patients and 5 out of 37 controls, $p<0.05$. Also 3 months mortality was higher in patients with micro albuminuria than without, thus proving the fact that **micro albuminuria is an independent risk factor for ischemic stroke and also is a prognostic marker.**

9. J Chowdhury studied 82 people between 45-70 years . 86% of MA +ve, and 63% MA –ve group . 63.3% are males and 36% were females in MA +ve group. 13.3% are females and 86.7% are males in MA –ve group. The mean age and sex differences between patients in both groups were not significant. According to that study, mortality rate in MA +ve group was 26.7% and that of MA –ve group is 11.7%. So **Micro albuminuria associated with higher mortality.**

10. Ghosh et al made a group of 83 and acute ischemic stroke patients(who were not diabetic) were included. Two more groups were formed .One group by 60 healthy individuals whose age, sex were matched and other group by 70 patients who had chronic neurological disease. On day 1,4,7 spot urinary albumin creatinine ratio in first morning sample was measured. 61.79% with acute ischemic stroke were MA +ve on day 1 .Only 13% in non stroke neurological patients and only 7% in healthy controls. Patients with MA has 25-45% (high) 14 day disease mortality. Patients without stroke has only 5.88% mortality. Thus **micro albuminuria associated with acute ischemic stroke and also high disease mortality.**

11. Klausen studied timed overnight sample of urine collected from 491 woman and men with coronary artery disease. 141 patients in that group died during the follow up period. The death risk associated with MA were 100% high . Thus proving **micro albuminuria is associated with increased mortality in patients with cardiovascular diseases**

12. Gumbnger et al studied the potential of micro albuminuria as a prognostic marker in acute ischemic stroke . And concluded that \ **micro albuminuria is a good predictor of poor outcome.**

13. Lee et al.in his study gave a conclusion that **micro albuminuria has a independent and strong association with stroke .**

14. Meng Lee, Jeffrey L Saver et al, did a meta analysis in Los Angeles, they took 12 studies, with total of 48,598 participants 1263 stroke incidents. **They concluded that micro albuminuria was associated with higher risk of stroke even after adjustment for cardiovascular risk factors .**

15. Nancy Beamer, Bruce M Coull, Wayne M Clarke, Mike Wynn did a study in Portland in 1999.They found out that micro albuminuria was 3 times prevalent in patients with recent stroke. The prevalence of micro albuminuria was high in all ischemic stroke subtypes like athero embolic, thrombotic and lacunar. Thus **Micro albuminuria was an independent significant risk factor of future stroke.**
16. .Farooq et al did a cross sectional study in 2009 to determine the frequency of micro albuminuria in patient with ischemic stroke. Out of the 195 patients of ischemic stroke micro albuminuria was present in 94 and absent in 101.

17. Dirk Sander et found that **micro albuminuria is associatied with increase in thickness of intima and media of blood vessel wall,** peripheral vascular disease, decrease in ankle brachial index.

18. Nidhinandana et al did a study during 2008. He found the association between risk factors for ischemic stroke in patients and concluded that diabetic mellitus and hypertension are one of the important factor for ischemic stroke. The diabetes and hypertension were associated with micro albuminuria.

METHODS TO DETECT MICRO ALBUMINURIA

1. Dipstick method
2. Semi quantitative analysis
3. Chemical precipitation tests
4. Quantitative analysis like radioimmunoassay

TREATMENT FOR MICRO ALBUMINURIA

1. Control of hypertension- drug of choice – ACE I , ARB
2. Control of blood glucose
3. Treatment of hyperlipidemia
4. Protein restriction
5. Cessation of smoking.
6. Drug effective in lowering micro albuminuria – ACE I, ARB, perindopril – indapamide .

METHODOLOGY

SOURCE OF DATA

The patients admitted in the department of Rajiv Gandhi Government General Hospital affiliated to Madras Medical College between Jan 2018 to JUNE 2018 were taken in our study. The ethical committee approval was obtained. There were 50 patients enrolled , diagnosed clinically ,confirmed by CT brain.

Cases : 50 patients diagnosed to have ischemic stroke by clinical methods and by ct brain presenting within 48 hrs and who are non- diabetic

Controls :50 Age and sex matched individuals who are non- diabetic and have not suffered from ischemic stroke

STUDY DESIGN

It was a prospective observational study.

INCLUSION CRITERIA

1. The patients diagnosed as stroke according to WHO criteria within 48 hours of onset
2. Confirmed by CT
3. Consent obtained from the patient.

EXCLUSION CRITERIA

1. The patients with hemorrhagic stroke
2. Recurrent CVA
3. Diabetes mellitus
4. Kidney diseases and non nephrotoxic drugs
5. Liver diseases
6. Chronic inflammatory conditions
7. Connective tissue disorders
8. Neoplasms
9. On immunosuppressant therapy
10. Fever or foci of acute infect

INVESTIGATIONS

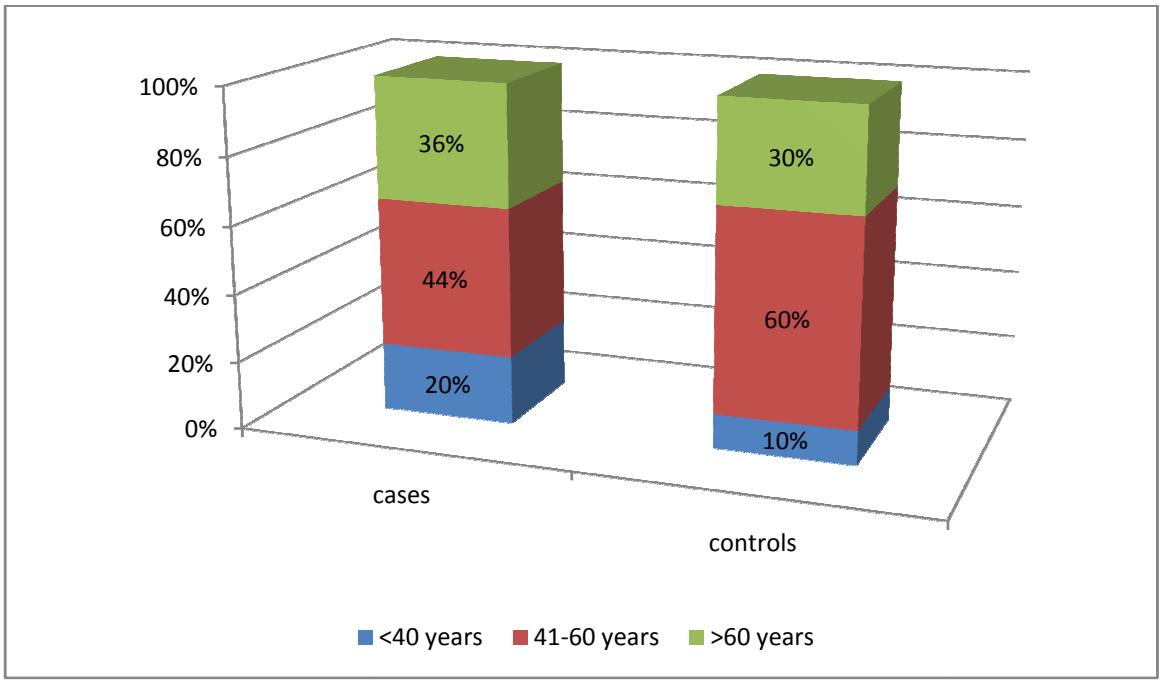
1. Renal function test
2. Liver function test
3. Serum electrolytes
4. Fasting lipid profiles
5. Random blood sugar
6. Spot urine albumin creatinine ratio
7. CT Brain

RESULTS AND OBSERVATIONS

Table 1a - Age distribution in cases and controls

Age in years	Cases		Controls	
	N	%	N	%
<40 years	10	20%	5	10%
41-60 years	22	44%	30	60%
>60 years	18	36%	15	30%
total	50	100%	50	100%

Pearson chi square = 3.170 p=0.20



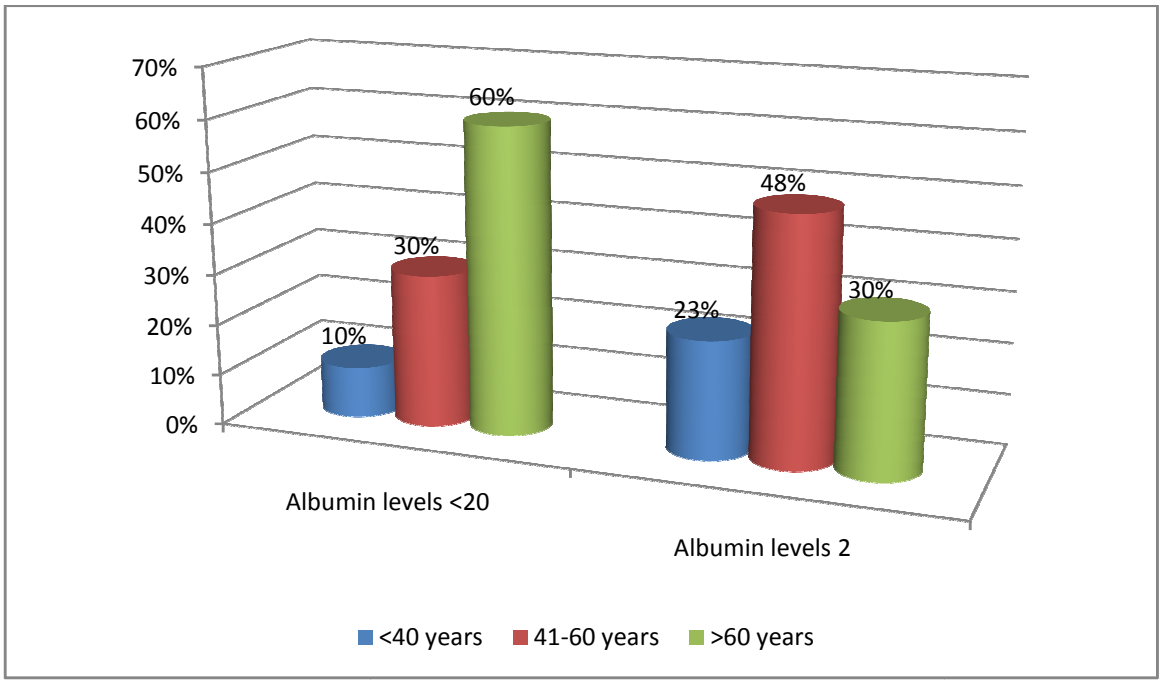
1) p value is 0.20

2) Inference : **There is no statistically significant difference in age distribution in cases and controls**

Table 1.b. Age distribution and urine albumin levels

Age distribution	Urine albumin levels <20		Urine Urine albumin levels 20-200	
	N	%	N	%
<40 years	1	10%	9	23%
41-60 years	3	30%	19	48%
>60 years	6	60%	12	30%
total	10	100%	40	100%

Chi square= 3.18182 p=0.20374



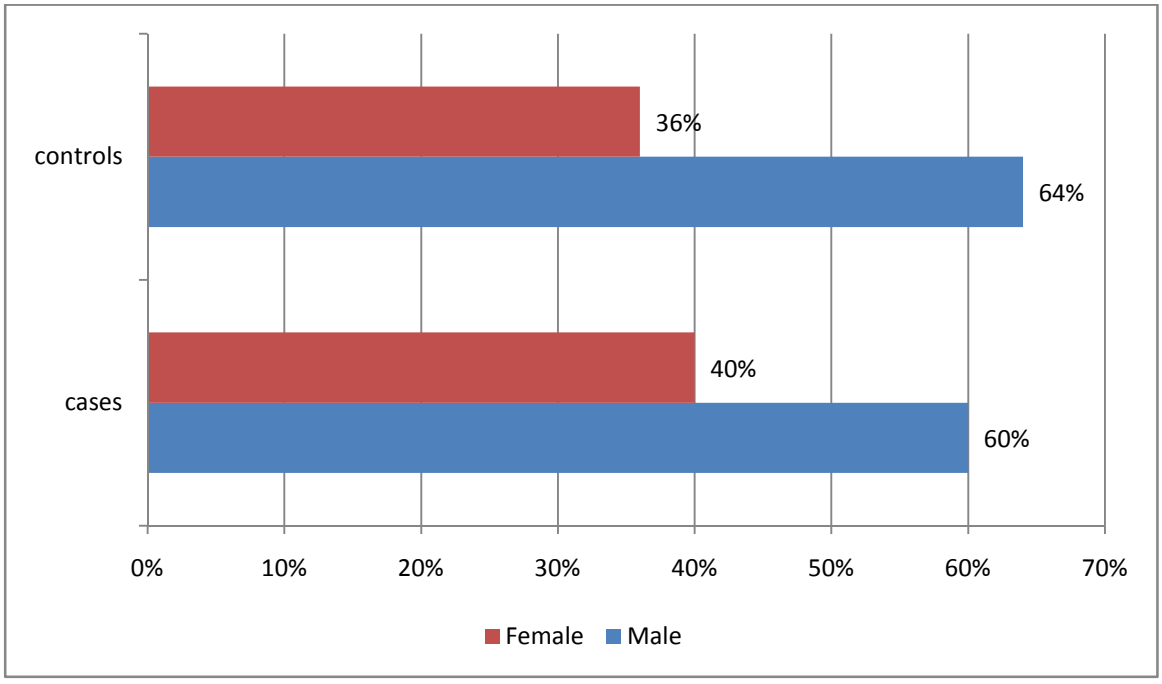
1) P value is 0.20374

2) Inference : **Age distribution is not statistically significantly associated with urine albumin levels**

Table 2.a Sex distribution in cases and controls

Sex distribution	Cases		Controls	
	N	%	N	%
Male	30	60%	32	64%
Female	20	40%	18	36%
Total	50	100%	50	100%

Pearson chi square = 0.170 p=0.680



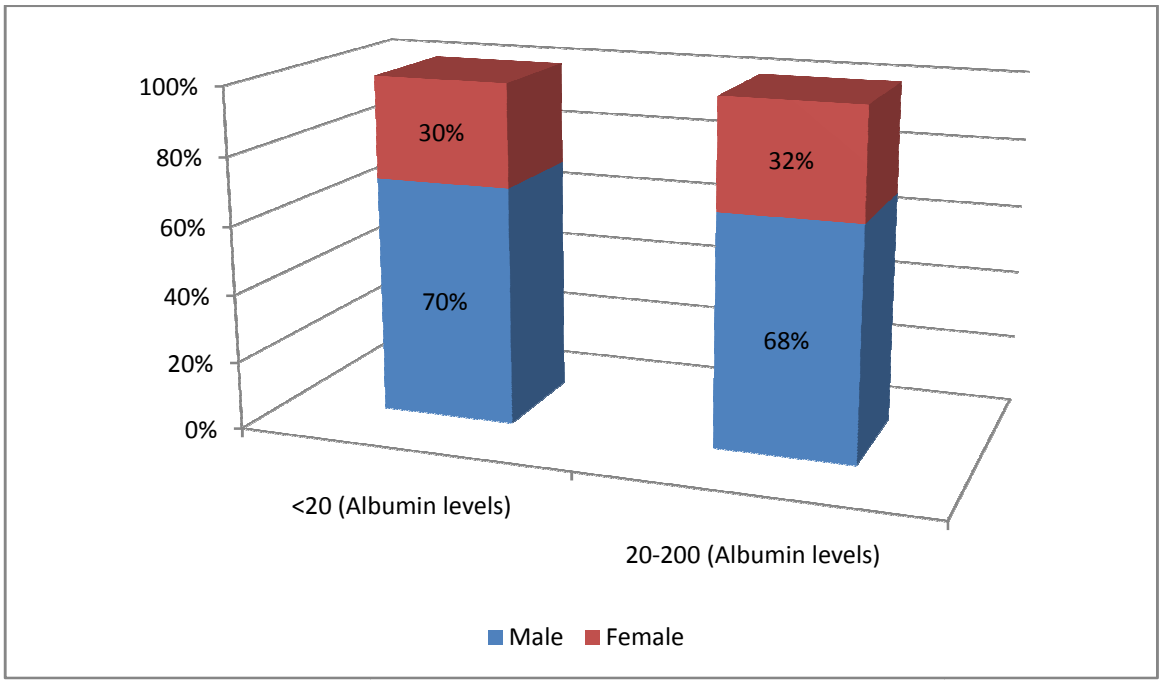
1) p value is 0.680

2) Inference : **There is no statistically significance difference in sex distribution in case and controls**

Table 2b – Sex distribution and urine albumin levels

Sex distribution	Urine Urine albumin levels <20		Urine albumin levels 20-200	
	N	%	N	%
Male	7	70%	27	67.5%
Female	3	30%	13	32.5%
total	10	100%	40	100%

Chi square =0.0229779 p=0.879514



1. P value is 0.879514

2. Inference : **Sex distribution has no statistically significant association with Urine albumin level**

Table 3 – Duration of symptoms in hours

Duration of symptoms in hours	Number of cases	
<8	3	6%
9-24	32	64%
24-48	15	30%

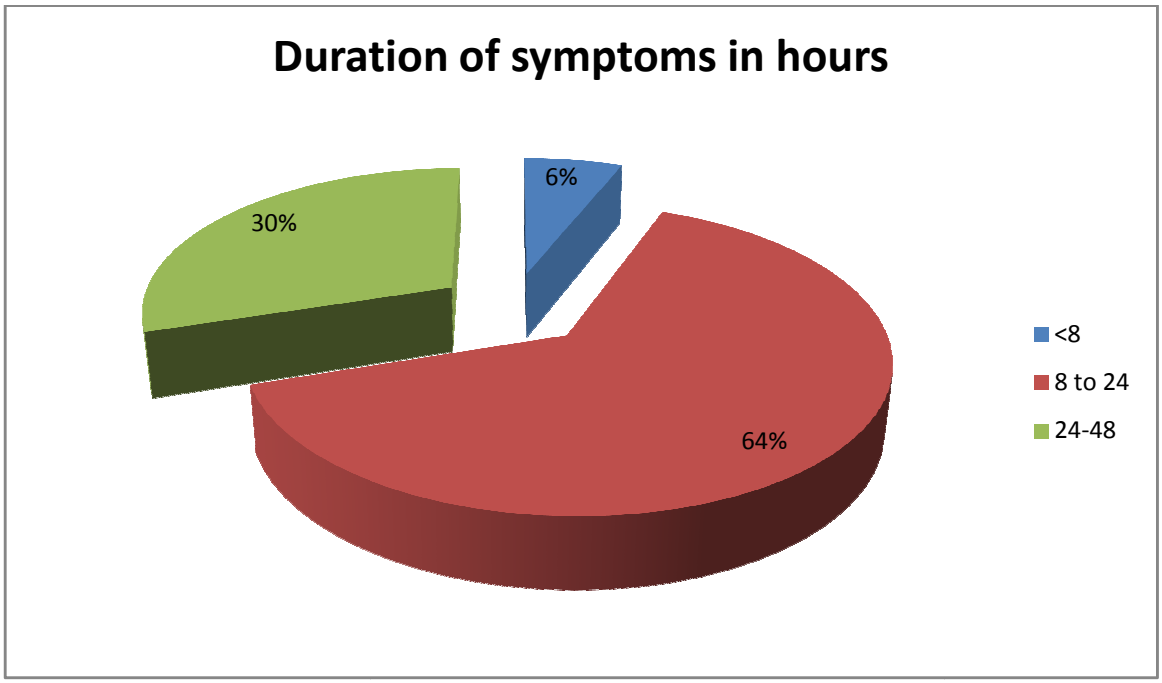
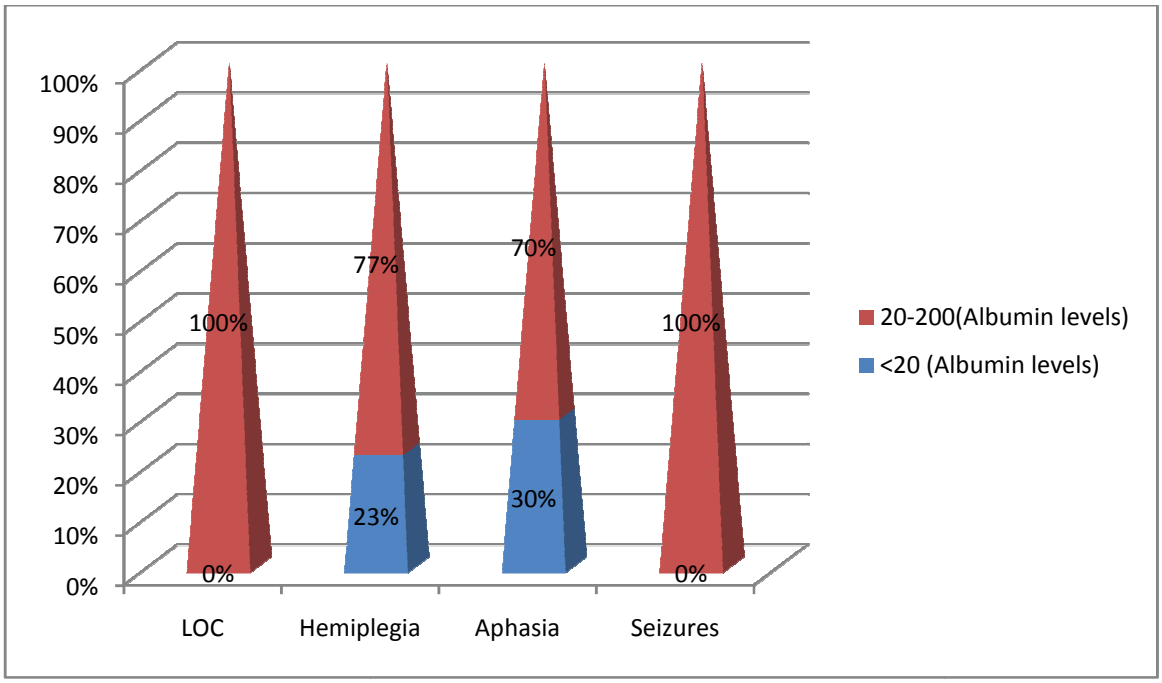


Table 4 – Symptoms

Symptoms	<20 (Urine Urine urine albumin levels)		20-200(Urine Urine urine albumin levels)		
	N	%	N	%	Total
LOC	0	**0%**	6	**100%**	**16**
Hemiplegia	10	**23%**	34	**77%**	**44**
Aphasia	6	**30%**	14	**70%**	**20**
Seizures	0	**0%**	6	**100%**	**6**



1) Severe symptoms like loss of consciousness and seizures were 100% associated with micro albuminuria

2) Inference : **Micro albuminuria correlates with severity of stroke**

Table 5 – Paucity of movements

Paucity of movements	Urine albumin levels<20		Urine albumin levels 20-200		total
	N	%	N	%	
Left	4	40%	20	50%	24
Right	6	60%	14	35%	20
None	0	0%	6	15%	6

Pearson chi square =2.917 p=0.233

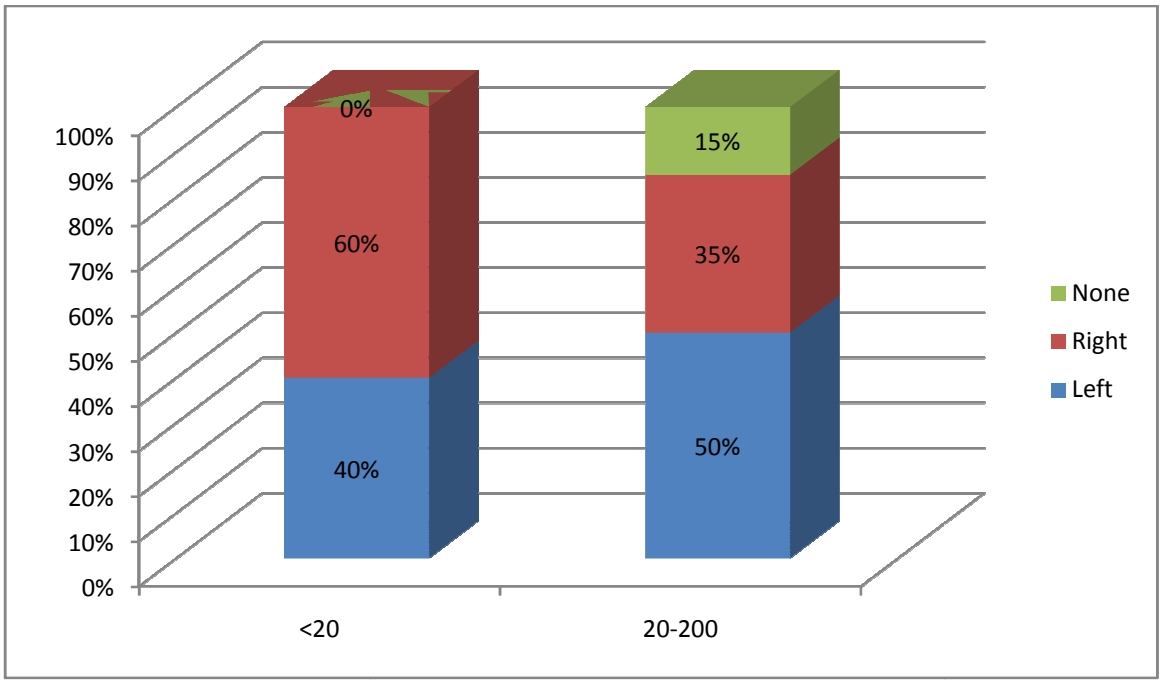
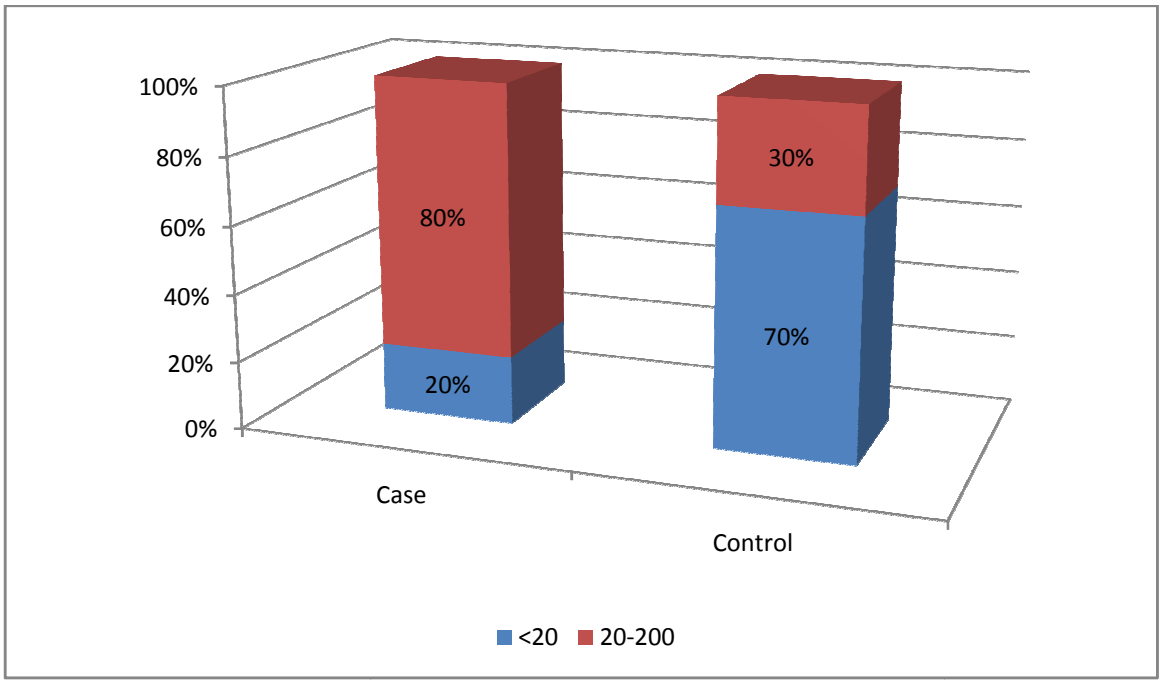


Table 6 – Micro albuminuria in cases and control

Urine albumin levels	Case		Control	
	N	%	N	%
<20	10	20%	35	70%
20-200	40	80%	15	30%
total	50	100%	50	100%

Pearson chi square =50.505** p<0.001



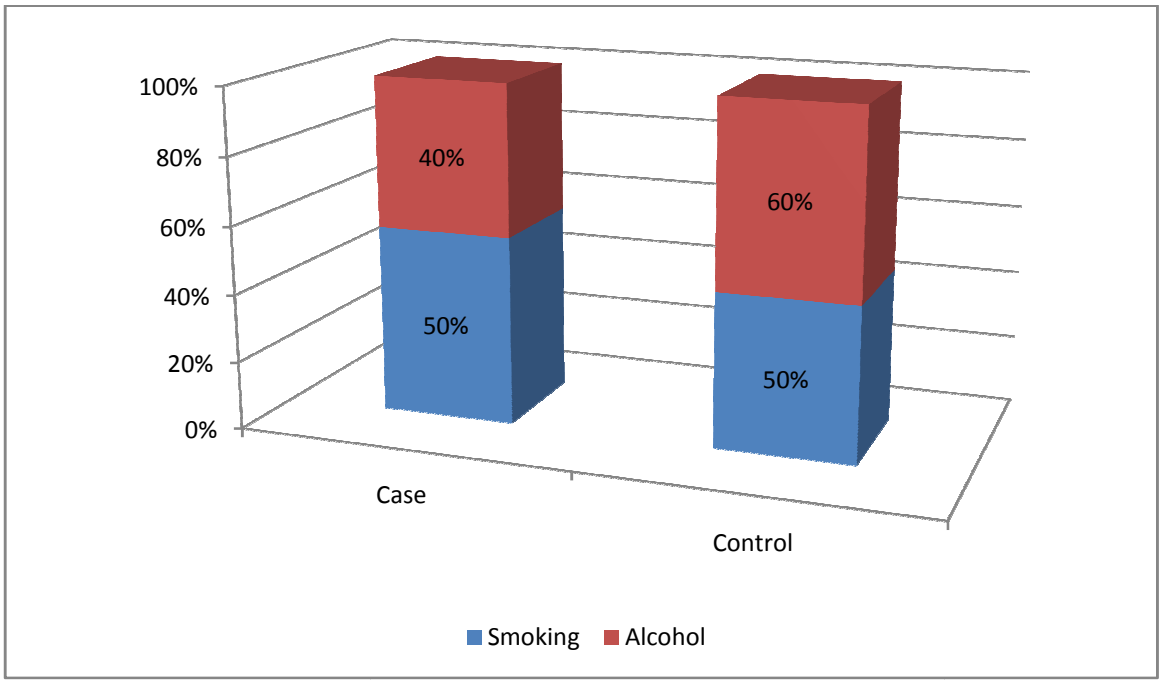
1. Pvalue is < 0.001

2. Inference : **Micro albuminuria is a risk factor for stroke**

Table 7 – Risk factors

Risk factor	<20 (Urine albumin levels)		20- 200 (Urine albumin levels)	
	N	%	N	%
Smoking(20)	10	50%	10	50%
Alcohol(25)	10	40%	15	60%
total	20	44%	25	66%

Pearson chi square =0.450 p=0.5020.001



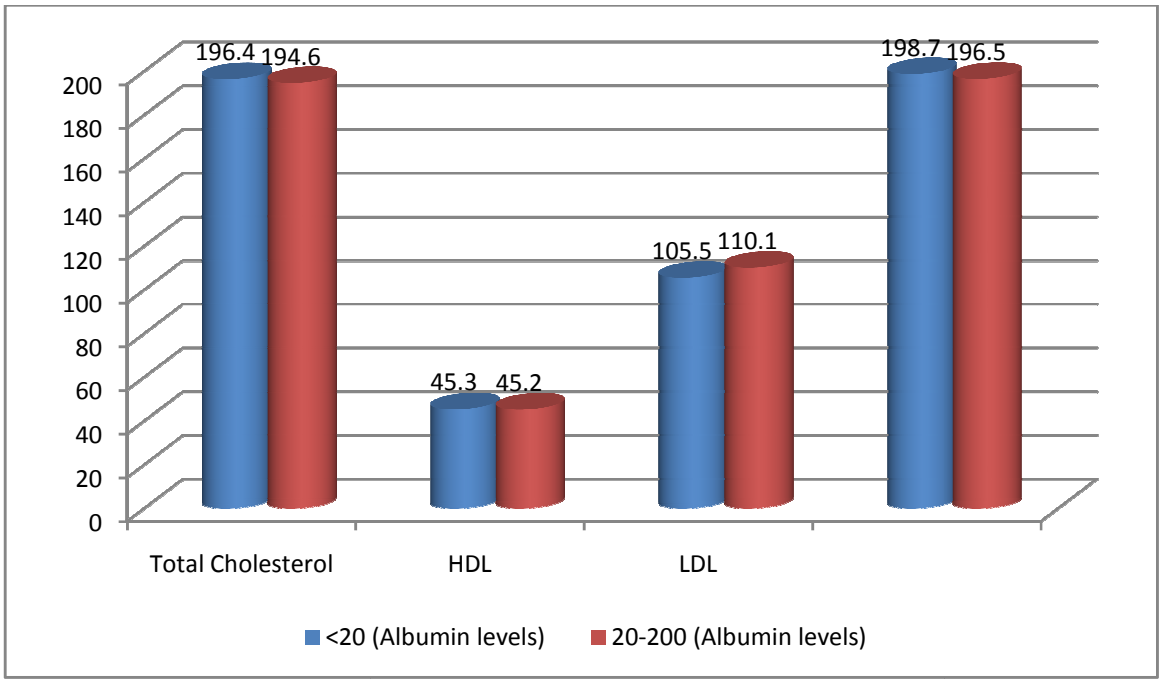
1. Pvalue is 0.5020

2. Inference : **Smoking and alcohol is not statistically significantly associated with micro albuminuria**

Table 8 – Fasting lipid profile

	<20 (Urine albumin levels) Mean cholesterol	20-200 (Urine albumin levels) Mean cholesterol
Total Cholesterol	196.4	194.6
HDL	45.3	45.2
LDL	105.5	110.1
Triglyceride	198.7	196.5

p>0.05



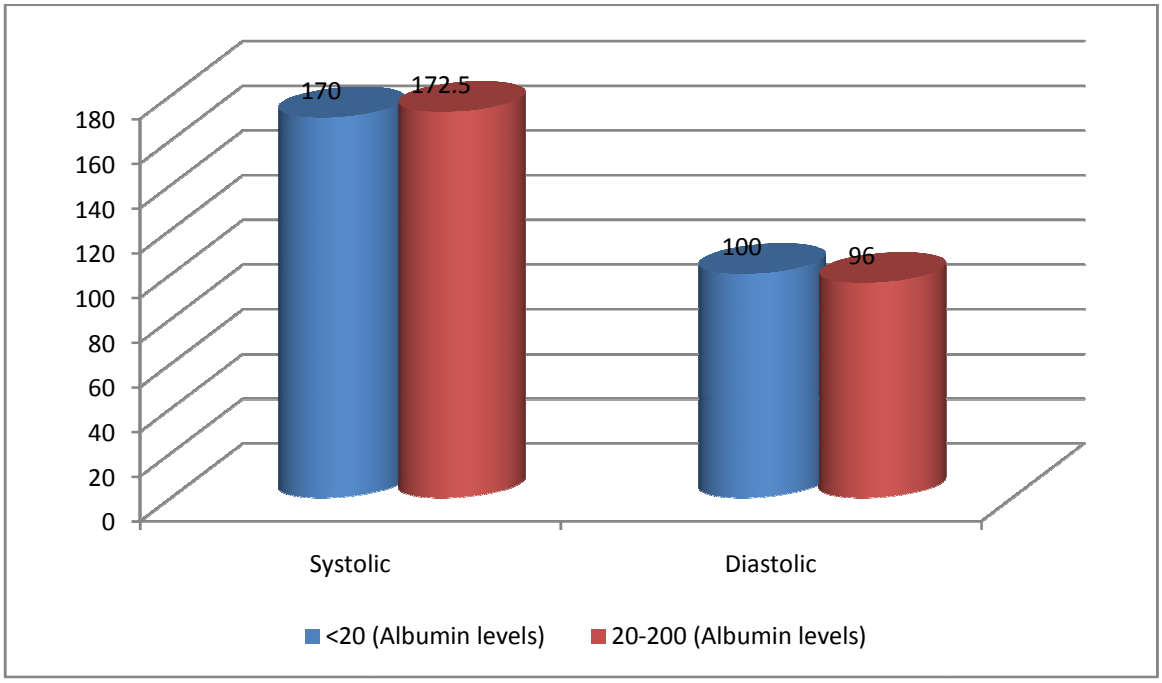
1. P value is >0.05

2. Inference : **Lipid profile has no statistically significant association with Micro albuminuria**

Table 9 – Blood pressure

BP	<20(Urine albumin levels) Mean BP	20-200 (Urine albumin levels) Mean BP
Systolic	170	172.5
Diastolic	100	96

p>0.05



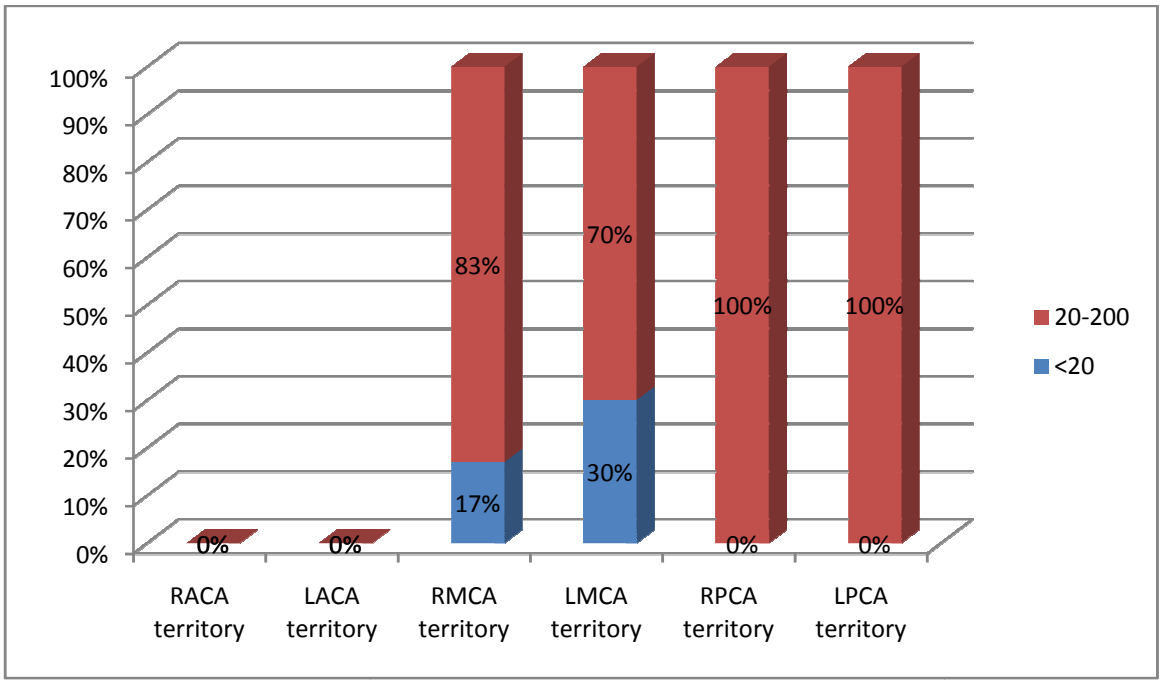
1) P value is >0.05

2) **Inference : Blood pressure has no statistically significant association with Micro albuminuria**

Table 10 – CT findings

	<20 Urine albumin levels		20-200 Urine albumin levels		
CT Brain	N	%	N	%	Total
RACA territory	0	0%	0	0%	0
LACA territory	0	0%	0	0%	0
RMCA territory	4	17%	20	83%	24
LMCA territory	6	30%	14	70%	20
RPCA territory	0	0%	3	100%	3
LPCA territory	0	0%	3	100%	3

Pearson chi square =2.917 p=0.405



1) P value is 0.405

2) **Territory of stroke has no statistically significant association with Micro albuminuria**

3) **Most commonly affected was right middle cerebral artery**

DISCUSSION

1. Cases : 50 patients diagnosed to have ischemic stroke by clinical methods and by ct brain presenting within 48 hrs and are non-diabetic
2. Controls : Age and sex matched individuals who are non-diabetic and have not suffered from stroke
3. In comparing age distribution in case and controls p value is 0.20. **There is no statistically significant difference in age distribution in cases and controls**
4. In comparing sex distribution in cases and controls p value is 0.680. **There is no statistically significance difference in sex distribution in case and controls**
5. P value is 0.20374 in studying association between age distribution and urine albumin levels. **Age distribution is not statistically significantly associated with urine albumin levels.**
6. P value is 0.879514 in studying association between sex distribution and urine albumin levels. **Sex distribution has no statistically significant association with urine albumin levels.**
7. Severe symptoms like loss of consciousness and seizures were 100% associated with micro albuminuria. **Micro albuminuria correlates with severity of stroke**

8. In comparing albumin level among cases and control P value is < 0.001. **Micro albuminuria is a risk factor for stroke.**

9. P value is 0.5020 in studying association between smoking, alcohol with urine albumin levels . **Smoking and alcohol is not statistically significantly associated with micro albuminuria**

10. P value is >0.050 in studying association between lipid profile and albumin levels. **Lipid profile has no statistically significant association with micro albuminuria**

11. P value is >0.05 studying association between hypertension and urine albumin **Blood pressure has no statistically significant association with micro albuminuria.**

12. Points 9,10,11 prove that micro albuminuria is independently associated with stroke. Not associated with other factors

13. P value is 0.405 in studying association between territory involved and urine albumin levels. **Territory of stroke has no statistically significant association with micro albuminuria.**

14. Most commonly affected was right middle cerebral artery

15. Out of 50 stroke patients 80% have micro albuminuria .
16. Out of 55 patients who have micro albuminuria 40 patients 72.72% have stroke.
17. Thus micro albumunria is an independent risk factor in acute non diabetic ischemic stroke.

CONCLUSION

There are many studies that have documented micro albuminuria as a risk factor for acute ischemic stroke.

In our studies too micro albuminuria was found to be an independent risk factor in acute ischemic stroke. Also we found that micro albuminuria was associated with severe disease.

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PROFORMA

Patient profile

NAME: OP/IP NO:

AGE: DOA:

SEX: DOD:

OCCUPATION:

ADDRESS:

PRESENTING COMPLAINTS

1. Paucity of movements of one side of the body

Yes/No –

Duration –

2. Loss of consciousness

Yes/No-

Duration-

3. Seizures

Yes /No –

Duration –

Type –

4.Aphasia

Yes /No –

Duration –

PAST HISTORY

Diabetes mellitus-

HTN –

Renal insufficiency-

Liver disease-

H/O vascular events-

FAMILY HISTORY

Diabetes mellitus-

HTN

Cerebrovascular accidents-

PERSONAL HISTORY

Appetite-

Diet-

Sleep-

Bladder movement-

Bowel movement-

Smoking –

Alcohol intake-

OBSTETRIC HISTORY

(In females)

GENERAL PHYSICAL EXAMINATION

Built – poor/moderate/well

Nourishment – poor/moderate/well

Pallor-

Icterus-

Cyanosis

Clubbing-

Lymphadenopathy-

Oral cavity-

Oedema-

Weight-

Height-

VITALS

Pulse-

B.P-

JVP-

RR-

Temperature-

SYSTEMIC EXAMINATION

CNS

- Higher mental functions
- Cranial nerve examination
- Motor examination
  - Tone
  - Power
  - Reflexes
  - Babinski sign
- Sensory examination
- Cerebellar signs
- Spinal examination
- Meninges

OTHER SYSTEMS

INVESTIGATIONS

1. RFT :
2. LFT :
3. SERUM ELECTROLYTES:
4. FLP :
5. RBS :
6. ECG :

10. CT BRAIN
11. SPOT URINARY ACR :

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI 600 003

EC Reg.No.ECR/270/Inst./TN/2013
Telephone No.044 25305301
Fax: 011 25363970

CERTIFICATE OF APPROVAL

To

Dr.R.Priyanka
I Year PG in MD General Medicine
Institute of Internal Medicine
Madras Medical College
Chennai 600 003

Dear Dr.R.Priyanka,

The Institutional Ethics Committee has considered your request and approved your study titled **"A STUDY OF MICROALBUMINURIA AS AN INDEPENDENT RISK FACTOR IN NON-DIABETOC ISCHEMIC STROKE" - NO.07052017**

The following members of Ethics Committee were present in the meeting hold on **02.05.2017** conducted at Madras Medical College, Chennai 3

1.Prof.Dr.C.Rajendran, MD.,	:Chairperson
2.Prof.R.Narayana Babu, MD.,DCH.,Dean, MMC,Ch-3	:Deputy Chairperson
3.Prof.Sudha Seshayyan,MD., Vice Principal,MMC,Ch-3	:Member Secretary
4.Prof.S.Suresh,MS.,Prof.of Surgery,MMC, Ch-3	: Member
5.Prof.S.Mayilvahanan,MD,Director,Inst. of Int.Med,MMC, Ch-3	: Member
6.Tmt.J.Rajalakshmi, JAO,MMC, Ch-3	: Lay Person
7.Thiru S.Govindasamy, BA.,BL,High Court,Chennai	: Lawyer
8.Tmt.Arnold Saulina, MA.,MSW.,	:Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

Member Secretary – Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

KEYWORDS

LOC – loss of consciousness

SZS – seizures

APH- aphasia

Alb- urine albumin levels

Smo- smoking

Alc- alcohol

TC- total cholesterol

UR- urea

CR- creatinine

Electro- electrolytes

CTB – CT Brain

MA – Micro albuminuria

N- Normal

URKUND

Urkund Analysis Result

Analysed Document:	Microaluminuria and stroke.docx (D42464874)
Submitted:	10/12/2018 11:11:00 AM
Submitted By:	priyankasuragh22@gmail.com
Significance:	4 %

Sources included in the report:

final upload.docx (D31273758)
LAT-ORIGINAL final thesis.docx (D31193228)
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SEVERITY OF ACUTE ISCHEMIC STROKE IN CORRELATION WITH MICROALBUMINURIA.docx (D31216408)
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https://jamanetwork.com/journals/jamaneurology/fullarticle/775109
http://www.healthinaging.org/aging-and-health-a-to-z/topic:stroke/
http://www.jsirjournal.com/Vol5_Issue3_02.pdf

Instances where selected sources appear:

10

CERTIFICATE – II

This is to certify that this dissertation work titled " **A STUDY OF MICRO ALBUMINURIA AS AN INDEPENDENT RISK FACTOR IN NON-DIABETIC ISCHEMIC STROKE**" of the candidate DR. R. Priyanka with registration Number 201611018 for the award of M.D. in the branch of GENERAL MEDICINE. I personally verified the urkund.com website for plagiarism Check. I found that the uploaded thesis file contains from introduction to conclusion pages and result shows 4 percentage of plagiarism in the dissertation.

Guide & Supervisor sign with Seal.

INFORMATION SHEET

We are conducting a study on **"A STUDY OF MICROALBUMINURIA AS AN INDEPENDENT RISK FACTOR IN NONDIABETIC ISCHEMIC STROKE"** among patients attending Rajiv Gandhi Government General Hospital, Chennai and for that your specimen may be valuable to us.

The purpose of this study is to identify microalbuminuria as an independent risk factor in non diabetic stroke.

We are selecting certain cases and if you are found eligible, we may perform extra tests and special studies which in any way do not affect your final report or management.

The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time; your decision will not result in any loss of benefits to which you are otherwise entitled.

The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of Investigator

Signature of Participant

Date :

Place :

PATIENT CONSENT FORM

Study Detail : **A STUDY OF MICROALBUMINURIA AS AN INDEPENDENT RISK FACTOR IN :NONDIABETIC ISCHEMIC STROKE**

Study Centre : Rajiv Gandhi Government General Hospital, Chennai.

Patient's Name :

Patient's Age :

Identification Number :

Patient may check (√) these boxes

a) I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask question and all my questions and doubts have been answered to my complete satisfaction. ☐

b) I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving reason, without my legal rights being affected. ☐

c) I understand that sponsor of the clinical study, others working on the sponsor's behalf, the ethical committee and the regulatory authorities will not need my permission to look at my health records, both in respect of current study and any further research that may be conducted in relation to it, even if I withdraw from the study I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from this study. ☐

d) I agree to take part in the above study and to comply with the instructions given during the study and faithfully cooperate with the study team and to immediately inform the study staff if I suffer from any deterioration in my health or well being or any unexpected or unusual symptoms. ☐

e) I hereby consent to participate in this study. ☐

f) I hereby give permission to undergo detailed clinical examination and blood investigations as required. ☐

Signature of Investigator
Dr.Priyanka.R

Signature\thumb impression
Patient Name and address

ஆய்வு தகவல் தாள்

ஆய்வு தலைப்பு :
நீரிழிவு நோய் அல்லாத குருதியூட்ட குறைவினால் வரும் பக்கவாத நோயாளிகளில் ஒரு தனித்த ஆபத்து காரணியாக மைக்ரோஅல்புமினூரியா குறித்த ஓர் ஆய்வு.

ஆய்வாளர் பெயர் : மரு. R. பிரியங்கா

ஆய்வு நிலையம் : பொது மருத்துவப் பிரிவு,
சென்னை மருத்துவக் கல்லூரி, சென்னை-3.

இந்த ஆய்வில் தங்களை பங்கேற்க அழைக்கிறோம். இந்த தகவல் அறிக்கையில் கூறப்பட்டிருக்கும் தகவல்கள் தாங்கள் இந்த ஆராய்ச்சியில் பங்கேற்கலாமா வேண்டாமா என்பதை முடிவு செய்ய உதவியாக இருக்கும். இந்த படிவத்தில் உள்ள தகவல்கள் பற்றி உள்ள சந்தேகங்களை நீங்கள் தயங்காமல் கேட்கலாம்.

இதில் ஆய்வின் மூலம் நீரிழிவு நோய் அல்லாத குருதியூட்ட குறைவினால் வரும் பக்கவாத நோயாளிகளில் ஒரு தனித்த ஆபத்து காரணியாக மைக்ரோஅல்புமினூரியா குறித்த ஓர் ஆய்வு பற்றி அறிவதற்கு தங்கள் ஒத்துழைப்புத் தேவை.

நீங்கள் இந்த ஆராய்ச்சியில் பங்கேற்க நாங்கள் விரும்புகிறோம். முடிவுகளை அல்லது கருத்துகளை வெளியிடும் போதோ அல்லது ஆராய்ச்சியின் போதோ தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிடமாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய விருப்பத்தின் பேரில்தான் இருக்கிறது. மேலும் நீங்கள் எந்த நேரமும் இந்த ஆராய்ச்சியில் இருந்து பின் வாங்கலாம் என்பதையும் தெரிவித்துக்கொள்கிறோம்.

இந்த சிறப்புப் பரிசோதனையின் முடிவுகளை ஆராய்ச்சியின் போது அல்லது ஆராய்ச்சியின் முடிவில் தங்களுக்கு அறிவிப்போம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

ஆராய்ச்சியாளர் கையொப்பம்

தேதி :

பங்கேற்பாளர் கையொப்பம் /
இடது கட்டைவிரல் ரேகை
தேதி :

ஆய்வு ஒப்புதல் படிவம்

ஆய்வு தலைப்பு :
நீரிழிவு நோய் அல்லாத குருதியூட்ட குறைவினால் வரும் பக்கவாத நோயாளிகளில் ஒரு தனித்த ஆபத்து காரணியாக மைக்ரோஅல்புமினூரியா குறித்த ஓர் ஆய்வு.

பெயர் :
வயது :
பால் :

தேதி :
வெளிநோயாளி எண் :
ஆராய்ச்சி சேர்க்கை எண் :

இந்த ஆராய்ச்சியின் விவரங்களும் அதன் நோக்கங்களும் முழுமையாக எனக்கு தெளிவாக விளக்கப்பட்டது. எனக்கு விளக்கப்பட்ட விஷயங்களை நான் புரிந்துகொண்டு நான் எனது சம்மதத்தை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் நீரிழிவு நோய் அல்லாத குருதியூட்ட குறைவினால் வரும் பக்கவாத நோயாளிகளில் ஒரு தனித்த ஆபத்து காரணியாக மைக்ரோஅல்புமினூரியா குறித்து ஆராயப்படுகிறது என்பதை ஆராய்ச்சியாளர் கூற அறிந்துகொண்டேன்.

மேற்கண்ட பரிசோதனையின் போது ஏற்படக்கூடிய பின்விளைவுகளையும் முழுவதும் உணர்ந்து இந்த பரிசோதனைக்கு மனமார சம்மதிக்கிறேன்.

நான் ஆராய்ச்சியாளருடன் ஒத்துழைப்பேன் என்றும், எனக்கு ஏற்படக்கூடிய ஆசாதாரண நிகழ்வுகள் பற்றியும் உடனடியாக ஆராய்ச்சியாளரிடம் தெரிவிப்பேன் என்று உறுதி கூறுகிறேன். இந்த ஆய்விலிருந்து எப்போது வேண்டுமானாலும் எக்காரணமும் கூறாமல் என்னை விடுவித்துக்கொள்ளலாம் என்பதை அறிவேன்.

என்னிடம் இருந்து பெறப்படும் தகவல்களை அரசு, வரைமுறை அதிகாரிகள் ஆகியோர்களுடன் பகிர்ந்துகொள்ள ஆராய்ச்சியாளருக்கு அனுமதி அளிக்கிறேன். என்னுடைய சிகிச்சைக்கட்டுகளை பார்வையிட உரிமை உண்டு. என்னுடைய தகவல்களின் அடையாளம் இரகசியமாக வைக்கப்படும் என்பதை அறிவேன்.

இந்த ஆராய்ச்சியில் பங்கேற்க தன்னிச்சையாக முழு மனதுடன் சம்மதிக்கிறேன்.

பங்கேற்பவரின் கையொப்பம் / ரேகை

பங்கேற்பவர் பெயர்

இடம் :

தேதி :

ஆய்வாளர் கையொப்பம்

ஆய்வாளர் பெயர்

இடம் :

தேதி :

MASTER CHART FOR CASES

S No	Name	Age	Sex	LOC	SZS	APH	Weakness	BP	Alb	SMO	ALC	TC	LDL	HDL	TGL	UR	CR	ELETRO	LFT	RBS	CTB
1	Mani	45	M	No	No	No	Left	150/80	40	Yes	Yes	200	105	45	170	20	0.8	N	N	110	RMCA
2	Raju	55	M	No	No	Yes	Right	170/90	60	No	Yes	160	113	50	190	34	0.6	N	N	126	LMCA
3	Venkatesh	52	M	No	No	Yes	Right	200/100	54	No	Yes	180	100	42	210	26	0.8	N	N	134	LMCA
4	Ravi	39	M	No	No	No	Left	160/110	50	Yes	Yes	240	118	34	240	28	0.8	N	N	75	RMCA
5	Baasha	63	M	No	No	Yes	Right	150/100	10	Yes	Yes	170	130	55	170	30	1.1	N	N	94	LMCA
6	Aravind	65	M	No	No	No	Left	190/90	46	No	No	210	105	32	180	32	0.8	N	N	89	RMCA
7	Manish	54	M	No	No	No	Left	170/110	15	Yes	Yes	240	140	40	240	22	0.6	N	N	110	RMCA
8	Rahul	49	M	No	No	No	Left	180/60	44	No	Yes	210	155	48	250	30	0.6	N	N	112	LMCA
9	Paramasivam	43	M	No	No	Yes	Right	160/60	110	No	Yes	132	130	48	192	20	0.7	N	N	130	LMCA
10	Ashwin	56	M	No	No	Yes	Right	170/110	12	Yes	Yes	140	72	32	140	34	0.7	N	N	122	LMCA
11	Ramachandran	59	M	Yes	Yes	No	No	180/90	150	Yes	Yes	250	92	53	210	24	0.7	N	N	96	LPCA
12	Rathinaraj	48	M	No	No	No	Left	160/80	90	No	Yes	220	80	54	220	28	0.8	N	N	110	RMCA
13	Saran	42	M	No	No	No	Left	160/120	118	No	Yes	180	130	50	180	26	0.6	N	N	92	RMCA
14	Hariharan	64	M	No	No	Yes	Right	200/120	112	No	No	200	100	35	160	24	0.6	N	N	84	LMCA
15	Bharath	36	M	No	No	Yes	Right	150/80	120	Yes	Yes	170	125	60	210	20	0.8	N	N	75	LMCA
16	Kuppusamy	74	M	No	No	No	Left	170/90	18	Yes	Yes	230	150	44	230	22	0.7	N	N	90	RMCA
17	Prabakaran	75	M	No	No	Yes	Right	160/90	14	Yes	Yes	150	85	42	150	20	1.1	N	N	110	LMCA
18	Kumaran	39	M	No	No	No	Left	190/110	120	Yes	Yes	210	93	52	180	34	1	N	N	112	RMCA
19	Senthilappan	63	M	No	No	Yes	Right	180/100	140	No	Yes	180	125	44	200	36	0.8	N	N	120	LMCA
20	Arokiyaraj	67	M	No	No	Yes	Right	160/110	162	No	No	160	72	42	210	20	1	N	N	124	LMCA
21	Sheikh Mohammed	72	M	No	No	No	Left	190/90	140	Yes	Yes	152	105	42	142	28	1.1	N	N	110	RMCA
22	Antony	78	M	No	No	No	Left	190/80	60	Yes	Yes	220	113	38	210	30	0.8	N	N	90	RMCA
23	Mohammed khan	80	M	No	No	No	Left	160/110	40	No	Yes	160	125	58	140	24	1.1	N	N	80	RMCA
24	Victor	20	M	No	No	No	Left	170/80	12	Yes	Yes	103	103	38	180	36	1.1	N	N	80	RMCA
25	Babu	52	M	No	No	Yes	Left	160/120	180	Yes	Yes	140	140	60	170	20	0.7	N	N	90	LMCA
26	ViNoth	56	M	Yes	Yes	No	No	200/120	110	Yes	Yes	85	85	55	170	32	0.6	N	N	94	LPCA
27	Jagan	72	M	No	No	Yes	Right	150/80	16	Yes	Yes	95	95	58	250	20	0.8	N	N	110	LMCA
28	Arunprabhu	69	M	No	No	No	Left	200/120	90	No	No	75	75	40	210	22	0.8	N	N	106	RMCA
29	Shiva	49	M	No	No	No	Left	170/110	80	Yes	Yes	115	115	32	240	24	0.9	N	N	104	RMCA
30	Anandhan	47	M	Yes	Yes	No	No	180/120	130	Yes	Yes	105	105	44	240	26	0.8	N	N	96	LPCA
31	Anjali	45	F	No	No	No	Left	160/80	40	No	No	210	130	43	230	20	0.6	N	N	74	RMCA
32	Rekha	62	F	No	No	No	Left	160/90	30	No	No	170	72	44	150	26	0.4	N	N	90	RMCA
33	Papathi	48	F	No	No	No	Left	200/120	60	No	No	230	150	60	230	26	0.6	N	N	86	RMCA
34	Nayaki	59	F	No	No	Yes	Right	150/100	90	No	No	240	190	45	240	30	0.6	N	N	84	LMCA
35	Karupaiye	68	F	No	No	Yes	Right	170/110	80	No	No	160	80	49	180	36	0.8	N	N	110	LMCA
36	Christie	36	F	No	No	No	Left	180/90	120	No	No	200	146	37	220	24	0.8	N	N	106	RMCA
37	Fariya	39	F	No	No	No	Left	160/80	80	No	No	220	130	63	180	22	0.7	N	N	108	RMCA
38	Ponnuthaiye	56	F	Yes	Yes	No	No	190/110	50	No	No	150	80	43	170	20	0.6	N	N	94	RPCA
39	Venda	69	F	No	No	Yes	Right	160/80	12	No	No	250	90	43	250	24	0.6	N	N	70	LMCA
40	Akila Begum	72	F	No	No	Yes	Right	160/80	40	No	No	240	100	39	210	26	1.1	N	N	96	LMCA
41	Muthammal	79	F	No	No	No	Left	170/120	160	No	No	140	150	37	170	20	1	N	N	110	RMCA
42	Chinnakuzandai	57	F	No	No	No	Left	160/80	140	No	No	232	130	45	230	20	0.8	N	N	120	RMCA
43	Chinnammal	49	F	Yes	Yes	No	No	160/90	64	No	No	150	73	50	170	24	0.6	N	N	130	RPCA
44	Ponammal	45	F	No	No	Yes	Right	170/110	10	No	No	220	70	44	220	26	0.6	N	N	102	LMCA
45	Meenakshi	55	F	No	No	Yes	Right	200/120	180	No	No	250	125	37	232	28	0.6	N	N	106	LMCA
46	Muthulakshmi	53	F	No	No	Yes	Right	160/100	110	No	No	230	136	58	160	20	0.9	N	N	104	LMCA
47	Akilandeshwari	62	F	No	No	Yes	Right	170/110	120	No	No	150	144	38	150	24	0.8	N	N	110	LMCA
48	Mary	66	F	No	No	No	Left	160/100	19	No	No	162	115	60	162	30	1.1	N	N	94	RMCA
49	Stella	57	F	No	No	No	Left	160/90	72	No	No	240	80	43	230	34	0.7	N	N	86	RMCA
50	Suganthi	43	F	Yes	Yes	No	No	160/110	72	No	No	160	90	44	240	20	0.6	N	N	74	RPCA

MASTER CHART FOR CONTROLS

S No	Name	Age	Sex	Urine alb	Smoking	Alcohol	BP	RFT	LFT	Electrolytes	RBS
1	Manikandan	45	M	12	Yes	yes	110/90	Normal	Normal	Normal	Normal
2	Kumar	42	M	11	Yes	yes	150/90	Normal	Normal	Normal	Normal
3	Sankar	46	M	120	Yes	yes	150/90	Normal	Normal	Normal	Normal
4	Kaliamurthy	30	M	15	No	No	140/80	Normal	Normal	Normal	Normal
5	Perumal	47	M	9	No	No	120/80	Normal	Normal	Normal	Normal
6	Manohar	55	M	90	No	yes	110/70	Normal	Normal	Normal	Normal
7	Jeevan	58	M	7	Yes	yes	120/80	Normal	Normal	Normal	Normal
8	Thuqlaq	48	M	15	Yes	yes	120/80	Normal	Normal	Normal	Normal
9	Pandu	54	M	64	No	No	110/70	Normal	Normal	Normal	Normal
10	Munyandi	70	M	18	No	No	120/90	Normal	Normal	Normal	Normal
11	Pichai	25	M	7	Yes	yes	130/80	Normal	Normal	Normal	Normal
12	Rangan	84	M	78	No	yes	130/90	Normal	Normal	Normal	Normal
13	Ramasamy	52	M	19	Yes	yes	180/90	Normal	Normal	Normal	Normal
14	Ravi	45	M	8	Yes	yes	170/100	Normal	Normal	Normal	Normal
15	Sabari	55	M	190	No	No	160/80	Normal	Normal	Normal	Normal
16	Govindasamy	56	M	11	No	No	140/90	Normal	Normal	Normal	Normal
17	Nithyanandha	58	M	12	No	yes	140/80	Normal	Normal	Normal	Normal
18	Krishna	65	M	110	No	No	150/90	Normal	Normal	Normal	Normal
19	Lakshmanan	68	M	16	Yes	yes	160/80	Normal	Normal	Normal	Normal
20	Peter	43	M	14	Yes	yes	170/110	Normal	Normal	Normal	Normal
21	John	43	M	112	No	No	160/90	Normal	Normal	Normal	Normal
22	Ganesh	49	M	8	No	yes	170/100	Normal	Normal	Normal	Normal
23	Muthu	50	M	16	Yes	yes	180/90	Normal	Normal	Normal	Normal
24	Sai	67	M	89	Yes	yes	170/70	Normal	Normal	Normal	Normal
25	Paul	69	M	14	No	Yes	180/90	Normal	Normal	Normal	Normal
26	Jeeva	41	M	12	No	No	170/90	Normal	Normal	Normal	Normal
27	Tennyson	44	M	60	No	No	160/80	Normal	Normal	Normal	Normal
28	Javid	42	M	7	No	Yes	190/90	Normal	Normal	Normal	Normal
29	Mahesh	59	M	16	Yes	yes	180/90	Normal	Normal	Normal	Normal
30	Madasamy	57	M	40	Yes	yes	130/70	Normal	Normal	Normal	Normal
31	Mari	72	M	18	Yes	yes	170/90	Normal	Normal	Normal	Normal
32	Babu	73	M	19	No	No	120/80	Normal	Normal	Normal	Normal
33	Sujitha	55	F	69	No	No	110/70	Normal	Normal	Normal	Normal
34	Suganya	56	F	13	No	No	110/80	Normal	Normal	Normal	Normal
35	Valanthi	51	F	14	No	No	120/100	Normal	Normal	Normal	Normal
36	Varshini	52	F	72	No	No	130/90	Normal	Normal	Normal	Normal
37	Charanya	64	F	15	No	No	170/80	Normal	Normal	Normal	Normal
38	Bamathy	74	F	19	No	No	150/90	Normal	Normal	Normal	Normal
39	Jasima	49	F	110	No	No	110/80	Normal	Normal	Normal	Normal
40	Thenmozhi	50	F	11	No	No	120/80	Normal	Normal	Normal	Normal
41	Thamizhisai	49	F	18	No	No	120/70	Normal	Normal	Normal	Normal
42	Sowmya	78	F	72	No	No	110/70	Normal	Normal	Normal	Normal
43	Divya	70	F	11	No	No	150/80	Normal	Normal	Normal	Normal
44	Bharathi	66	F	14	No	No	140/80	Normal	Normal	Normal	Normal
45	Saranya	32	F	93	No	No	150/80	Normal	Normal	Normal	Normal
46	Fathima	43	F	13	No	No	170/90	Normal	Normal	Normal	Normal
47	Priya	49	F	11	No	No	150/70	Normal	Normal	Normal	Normal
48	Poojitha	57	F	14	No	No	120/70	Normal	Normal	Normal	Normal
49	Aishwarya	65	F	19	No	No	130/80	Normal	Normal	Normal	Normal
50	Deepika	67	F	11	No	No	120/70	Normal	Normal	Normal	Normal